

## VERIFICATION OF TRANSLATION

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state that the patent specification of which was filed on July 14, 2003  
as U.S. Application Number 10/617,786 is a true and complete  
translation of: the patent specification of the Taiwanese Utility Model  
Application No. 091210758

to the best of my knowledge and belief. I believe that the English  
language translation is accurate.

Signed: Song-qiao Li

Dated: Dec. 16, 2004

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MINISTRY OF ECONOMIC AFFAIRS  
REPUBLIC OF CHINA**

This is to certify that annexed is a true copy from the records of this office of the application as originally filed which is identified hereunder:

Application Date: July 15, 2002

Application No.: 091210758

Applicant(s): Hung-Chang CHAO

Director General

## PATENT SPECIFICATION

**1. Title of the Invention:** A kitset bicycle combined with different stress directions

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#### **4. ABSTRACT OF THE DISCLOSURE**

(Title of the Invention: A kitset bicycle combined with different stress directions)

A detachable bicycle is disclosed. The bicycle comprises a front frame section comprising a joint tube at a rear end of the crossbar; a rear frame section comprising a sleeve extended forward, obliquely from the bottom bracket for receiving a lower portion of the down tube, and a seat tube extended upward from the bottom bracket to have its upper portion connected to the joint tube wherein the seat tube is substantially perpendicular with respect to the down tube; and a seat post inserted through the joint tube into the seat tube. The seat post and the seat tube are secured to the joint tube by means of a first quick release and a second quick release respectively. The down tube is secured to the sleeve by means of a third quick release.

(FIG. 1)

**PRIORITY CLAIMED:**

None

## **5. DETAILED DESCRIPTION OF THE DISCLOSURE**

### **Field of the Invention**

The present invention relates to bicycles and more particularly to a bicycle featured a detachable frame with improved characteristics.

### **Description of the prior art**

Conventionally, bicycles can be classified as ones featured a fixed frame and ones featured a foldable frame (e.g., folding bicycles). For the former, they are superior in a strong structure and less restrictions imposed on designs. For example, bicycles featured a popular rhombic frame are made possible. But they are also inferior for occupying space in delivery and/or storage. This is particularly true for electric bicycles. Nowadays, many cars have a rack for fastening a bicycle thereon so that a driver can carry the bicycle while going for an outing. However, the fastening process is tedious. Further, it may adversely affect safety while driving.

For the latter (i.e., folding bicycles), they are superior in saving space in delivery and/or storage. They are particularly suitable for being carried by cars for outings. But they are also inferior for being structurally weak because a potential break may occur at the folded portions of the bicycle. For overcoming such problem, reinforcement is added at the folded portions. Unfortunately, such reinforcement may detract the bicycle's appearance because many restrictions may be imposed on the design of bicycle due to the provision of releasable fastening devices (e.g., snap members, ring fasteners or the like) thereon. As a result, only a few types of folding bicycles are popular in the market. Further, some folding bicycles even have an increased width after folded. This can compromise the desired purpose of saving space in delivery and/or storage. Thus, the need for improvement still exists.

### **Summary of the invention**

It is an object of the present invention to provide a break apart bicycle

which can be assembled in two substantially opposite, vertical directions. The formed bicycle is as strong as a typical bicycle featured a fixed frame.

It is another object of the present invention to provide a break apart bicycle which can be quickly detached into at least two portions or assembled together in a do-it-yourself manner.

It is still another object of the present invention to provide a break apart bicycle in which detached components thereof can be tightly packed together so as to save storage space while going for an outing by driving a car.

It is yet another object of the present invention to provide a break apart bicycle in which no restrictions are imposed on designs for preserving the bicycle's appearance the same as that of a typical bicycle featured a fixed frame. Also, the bicycle can be implemented as one of a variety of bicycles such as bicycles featured a rhombic frame or Y frame, or lady bicycles.

It is a further another object of the present invention to provide a break apart bicycle which material used for packing the bicycle can be reduced up to 60 per centum. Thus, cost related to delivery, storage borne on the manufacturer is significantly reduced.

To achieve the above and other objects, the present invention provide a break apart bicycle, comprising a front frame section comprising a head tube, a fork, two handlebars, a front wheel releasably coupled to the fork, a crossbar, a down tube extended rearward, obliquely from the head tube, and a joint tube at a rear end of the crossbar; a rear frame section comprising two foot pedals, a sprocket wheel, a bottom bracket coupled to the foot pedals and a front axle of the sprocket wheel, a chain stay extended rearward from the bottom bracket to an axle of a rear wheel, a seat stay having a rear end coupled to the axle of the rear wheel, a sleeve extended forward, obliquely from the bottom bracket for receiving a lower portion of the down tube, and a seat tube extended upward from the bottom bracket to have its upper portion connected to the joint tube

wherein the seat tube is substantially perpendicular with respect to the down tube; and a seat post inserted through the joint tube into the seat tube, the seat post having a top saddle, wherein the seat post and the seat tube are secured to the joint tube by means of a first quick release and a second quick release respectively, and the down tube is secured to the sleeve by means of a third quick release.

**Brief description of the drawings**

The drawings disclose an illustrative embodiment of the present invention which serves to exemplify the various advantages and objects hereof, and are as follow:

FIG. 1 is a perspective view of a first preferred embodiment of break apart bicycle according to the invention;

FIG. 2 is an exploded view of the bicycle;

FIG. 3 is a side elevational view of the bicycle shown in FIG. 1;

FIG. 4 is an exploded view of the bicycle shown in FIG. 3;

FIG. 5 is a detailed view of the detached portions of the bicycle shown in FIG. 2;

FIG. 6 is a side elevational view of the detached bicycle stored in a compact manner for facilitating storage, delivery, or outing;

FIG. 7 is a side elevational view of a second preferred embodiment of break apart bicycle according to the invention;

FIG. 8 is a side elevational view of a third preferred embodiment of break apart bicycle according to the invention;

FIG. 9 is an exploded view of one of detachable portions of the bicycle shown in FIG. 8.

FIG. 10 is a side elevational view of a fourth preferred embodiment of break apart bicycle according to the invention;

FIG. 11 is an exploded view of the bicycle shown in FIG. 10; and

FIG. 12 is a detailed view of the semicircular sleeve of the bicycle shown in FIG. 10.



**List of the components**

10	front frame section	11	down tube
12	head tube	13	handlebars
14	fork	15	front wheel
16	first quick release	17	first crossbar
18	second crossbar	19	joint tube
20	upper end	21	saddle
22	seat post	23	second quick release
24	fifth quick release	25	third quick release
26	fourth quick release	27	longitudinal slit
30	rear frame section	31	bottom bracket
32	sleeve	34	pedals
35	sprocket wheel	36	seat tube
38	seat stay	39	seat stay
40	nut	41	rear wheel
42	upper end	43	longitudinal slit
45	safety pin	47	aperture
50	aperture	53	longitudinal slit
54	upper end	57	reinforced cylinder
58	aperture	68	annular flange
84	waterproof union nut	85	external threaded section
90	intermediate frame section	91	second bottom bracket
92	second sleeve	93	second down tube
94	second pedals	95	second sprocket wheel
96	second seat tube	97	semicircular sleeve
98	third crossbar	99	second joint tube
100	connecting tube	101	connecting tube
102	second saddle	103	second seat post
104	fastening member	105	hole
106	coupling device	107	parallel plates

108	hole	109	sixth quick release
110	seventh quick release	111	eighth quick release
112	ninth quick release	113	second handlebars

### **Detailed description of the invention**

Referring to FIGS. 1 to 4, a break apart bicycle constructed in accordance with a first preferred embodiment of the invention is shown. Each component of the bicycle will be described in detail below. The bicycle comprises a front frame section 10 and a rear frame section 30 adapted to assemble with the front frame section 10. The front frame section 10 comprises a head tube 12, a fork 14, handlebars 13, a front wheel 15 releasably coupled to the fork 14 by mean of a first quick release 16, a first crossbar 17, a second crossbar 18, and a down tube 11 extended rearward from the head tube 12 to be adapted to connect to a sleeve 32 formed obliquely at a forward side of a bottom bracket 31 which is formed on the rear frame section 30 by welding in which a second quick release 23 is used to fasten the down tube 11 and the sleeve 32 together as detailed later. A joint tube 19, as a part of seat tube, is connectable to a seat post 22 and a seat tube 36 by means of third and fourth quick releases 25 and 26 respectively, thereby forming a complete seat tube. A saddle 21 is mounted on the seat post 22. The seat tube 36 is extended upward from the bottom bracket 31. Note that the down tube 11 is substantially perpendicular with respect to the seat tubes 22 and 36. This has a benefit of increasing the structural strength of the assembled bicycle. Further, a disassembly of the above detachable components (e.g., the down tube 11, the seat tubes 22 and 36, and the front wheel 15) is obvious to those skilled in the art. Thus a detailed description thereof is omitted herein for the sake of brevity. It is seen that the bicycle components can be put together compactly so as to save storage space, for example while going for an outing by driving a car.

The first crossbar 17 is coupled to about an intermediate portion of the down tube 11 by welding. The second crossbar 18, as reinforcement, is coupled between the first crossbar 17 and the head tube 12. The joint tube 19 is at the rear end of the first crossbar 17. Also, at least one longitudinal slit 27 is formed at an upper end 20 of the joint tube 19 for permitting the upper end 20 of the joint tube 19 to slightly deform for fastening the seat post 22 by means of the third quick release 25. Likewise, at least one longitudinal slit 43 is formed at an upper end 42 of the seat tube 36 for permitting the upper end 42 of the seat tube 36 to slightly deform for fastening the joint tube 19 by means of the fourth quick release 26.

The bottom bracket 31 is provided to permit a pair of pedals 34 and a sprocket wheel 35 to connect thereto. The rear frame section 30 further comprises a seat stay 39 extended rearward from the bottom bracket 31, and a seat stay 38 extended upwardly, obliquely from axle of a rear wheel 41 to couple to the seat tube 36. The chain stay 39, the seat stay 38, and the seat tube 36 together form a seat stay assembly. The seat stay assembly together with the pedals 34, the sprocket wheel 35, and the bottom bracket 31 form a transmission mechanism of the rear frame section 30.

Referring to FIG. 5, a safety pin 45 is adapted to insert through an aperture 50 of the sleeve 32, an aperture 47 proximate a lower end of the down tube 11, and an aperture 58 of a solid, reinforced cylinder 57 for fastening the down tube 11 and the sleeve 32 together. The cylinder 57 is inserted into the lower end of the down tube 11. Also, the aperture 58 is provided to facilitate a user to quickly insert the safety pin 45 in place even in a dark environment. Also, at least one longitudinal slit 53 is formed at an upper end 54 of the sleeve 32 for permitting the upper end 54 of the sleeve 32 to slightly deform for fastening the down tube 11 by means of the second quick release 23. Note that the quick release is a well-known device. The quick release can be replaced by any fastener such as a bolt

and nut combination, clamp, ring fastener, snap fastener, or the like in any of other embodiments without departing from the scope and spirit of the invention as long as the purpose of quick assembly or disassembly of the bicycle is not compromised.

Referring to FIG. 6, there is shown the detached bicycle stored in a compact manner for facilitating storage, delivery, or outing. In detail, the front frame section 10, the rear frame section 30, and even the front wheel 15 are detached. Also, the handlebars 13 and the fork 14 are turned about 90 degrees to be parallel with the down tube 11, the first crossbar 17, and the second crossbar 18. Further, the detached seat post 22 is again inserted into the joint tube 19 at a lowest position with the seat 21 mounted on the seat post 22. Furthermore, one (or more) of the detached front frame section 10, the rear frame section 30, the front wheel 15, and the seat post 22 is (or are) inserted into gaps of the bicycle in a storage state or put together compactly for saving storage space. Alternatively, one (or more) of the detached front frame section 10, the rear frame section 30, the front wheel 15, and the seat post 22 is (or are) packed by a large bag. Preferably, material for packing the detached bicycle can be reduced up to 60% further. Thus, cost related to storage or delivery borne on the manufacturer is significantly reduced. Moreover, the invention is beneficial for being easy in assembly or disassembly in which skill is not important in assembling or detaching the bicycle in any place any time. In other words, the assembly or disassembly of the bicycle can be done in a do-it-yourself manner.

Referring to FIG. 7, a second preferred embodiment of the invention is illustrated. The second preferred embodiment substantially has same structure as the first preferred embodiment. The differences between the first and the second preferred embodiments, i.e., the characteristics of the second preferred embodiment are detailed below. A sleeve 32' is formed obliquely at a under side of a bottom bracket 31' by welding. At least two

longitudinal slit are formed at an upper end and a lower end of the sleeve 32' respectively for permitting the upper end and the lower end of the sleeve 32' to slightly deform for fastening the down tube 11' by means of the second and fifth quick release 23 and 24 respectively. Also, an aperture is provided to facilitate a user to quickly insert the safety pin 45 in place even in a dark environment.

Referring to FIGS. 8 and 9, a third preferred embodiment of the invention is illustrated. The third preferred embodiment substantially has same structure as the first preferred embodiment. The differences between the first and the third preferred embodiments, i.e., the characteristics of the third preferred embodiment are detailed below. A waterproof union nut 84 is used in place of the fourth quick release 26. The union nut 84 comprises an internal threaded section. Also, an external threaded section 85 is formed at a top end of the seat tube 36. The union nut 84 is thus secured to the seat tube 36 by threadedly coupling the internal threaded section thereof to the external threaded section 85 of the seat tube 36. Moreover, an annular flange 68 is formed at a lower end of the joint tube 19 for securing to the union nut 84 by snapping. As an end, the joint tube 19 and the seat tube 36 are fastened together by the union nut 84. The union nut 84 also has the benefit of preventing rain from falling into the seat tube 36.

Referring to FIGS. 10 to 12, the bicycle further comprises an intermediate frame section 90 which adapted to assemble with the front frame section and the rear frame section as a tandem bicycle. The down tube 11 of the front frame section 10 to be adapted to connect to a second sleeve 92 formed obliquely at a forward side of a second bottom bracket 91 which is formed on the intermediate frame section 90 by welding in which a second quick release 23 is used to fasten the down tube 11 and the second sleeve 92 together. The second bottom bracket 91 is provided to permit a pair of second pedals 94 and a second sprocket wheel 95 to connect thereto. A second seat tube 96 is extended upward from the

second bottom bracket 91. The second seat tube 96, as a part of seat tube, is connectable to the joint tube 19 and the seat post 22 by means of third quick releases 25, thereby forming a complete seat tube. A semicircular sleeve 97 is formed at an upper end of the second seat tube 96 for connecting a third crossbar 98 and a second down tube 93. The second down tube 93 extended rearward from the semicircular sleeve 97 to be adapted to connect to the sleeve 32 of the rear frame section 30 in which a sixth quick release 109 is used to fasten the second down tube 93 and the sleeve 32 together. A second joint tube 99 is at the rear end of the third crossbar 98. The second joint tube 99, as a part of seat tube, is connectable to a second seat post 103 and the seat tube 36 by means of seventh and eighth quick releases 110 and 111 respectively, thereby forming a complete seat tube. A second saddle 102 is mounted on the second seat post 103.

Referring to FIG. 12, a coupling device 106 is formed on the semicircular sleeve 97, the coupling device 106 consisting of two parallel plates 107 each featured at least one hole 108. A fastening member 104 is provided on the top of the joint tube 19. The fastening member 104 comprises a plate featured a hole 105, and a quick release featured a threaded shank in which the quick release is inserted through the holes 105 and 108, then pivot a latch of the quick release to compress the plates 107 toward each other, and finally secure the quick release by a nut.

At least two connecting tubes 100 and 101, as reinforcement, are coupled between the second bottom bracket 91, the third crossbar 98 and the second down tube 93. A second handlebars 113 is secured to the seat post 22 by means of a ninth quick release 112.

#### **Feature of the invention**

The various advantages and objects of the present invention are listed below:

- 1) Provide a break apart bicycle, which can be assembled in two

substantially opposite, vertical directions. The formed bicycle is as strong as a typical bicycle featured a fixed frame.

2) The break apart bicycle according to the invention can be quickly detached into at least two portions or assembled together in a do-it-yourself manner.

3) The detached components thereof can be tightly packed together so as to save storage space while going for an outing by driving a car.

4) No restrictions are imposed on designs for preserving the bicycle's appearance the same as that of a typical bicycle featured a fixed frame.

5) Also, the bicycle can be implemented as one of a variety of bicycles such as bicycles featured a rhombic frame or Y frame, or lady bicycles.

6) The material used for packing the bicycle can be reduced up to 60 per centum.

7) Cost related to delivery, storage borne on the manufacturer is significantly reduced.

Many changes and modifications in the above-described embodiment of the invention can, of course, be carried out without departing from the scope thereof. Accordingly, to promote the progress in science and the useful arts, the invention is disclosed and is intended to be limited only by the scope of the appended claims.

**What is claimed is:**

1. A break apart bicycle, comprising:

a front frame section comprising a head tube, a fork, two handlebars, a front wheel releasably coupled to the fork, a crossbar, a down tube extended rearward, obliquely from the head tube, and a joint tube at a rear end of the crossbar;

a rear frame section comprising two foot pedals, a sprocket wheel, a bottom bracket coupled to the foot pedals and a front axle of the sprocket wheel, a chain stay extended rearward from the bottom bracket to an axle of a rear wheel, a seat stay having a rear end coupled to the axle of the rear wheel, a sleeve extended from the bottom bracket for receiving a lower portion of the down tube, and a seat tube extended upward from the bottom bracket to have its upper portion connected to the joint tube wherein the seat tube is substantially perpendicular with respect to the down tube; and

a seat post inserted through the joint tube into the seat tube, the seat post having a top saddle,

wherein the seat post and the seat tube are releasably coupled to the joint tube, and the down tube is releasably coupled to the sleeve.

2. The break apart bicycle of claim 1, wherein the sleeve extended forward, obliquely from the bottom bracket, the sleeve comprises at least one longitudinal slit at an upper end, and further comprising a quick release put on the sleeve for fastening the down tube and the sleeve together by temporarily deforming the slit of the sleeve.

3. The break apart bicycle of claim 1, wherein the sleeve is formed obliquely at a under side of the bottom bracket, the sleeve comprises at least two longitudinal slit at an upper end and a lower end respectively, and further comprising a quick release put on the sleeve for fastening the down tube and the sleeve together by temporarily deforming the slit of the sleeve.



4. The break apart bicycle of claim 1, wherein the sleeve further comprises a radial aperture, the down tube comprises a radial aperture proximate a lower end, and further comprising a safety pin inserted through the apertures of the sleeve and the down tube for fastening the down tube and the sleeve together.

5. The break apart bicycle of claim 1, wherein the joint tube comprises at least one longitudinal slit at an upper end, the seat tube comprises at least one longitudinal slit at an upper end, and further comprising a quick release put on the joint tube for fastening the joint tube and the seat tube together by temporarily deforming the slit of the seat tube, and a quick release put on the joint tube for fastening the joint tube and the seat post together by temporarily deforming the slit of the joint tube.

6. The break apart bicycle of claim 1, further comprising a waterproof union nut including an internal threaded section, and an annular flange at a lower end of the joint tube and the seat tube further comprises an external threaded section at a top end so that the union nut is adapted to secure to the seat tube by threadedly coupling the internal threaded section to the external threaded section, and the flange is clung to the union nut for fastening the union nut and the joint tube together.

7. The break apart bicycle of claim 1, further comprising an intermediate frame including a second pedals, a second sprocket wheel, a second bottom bracket coupled to the second pedals and a front axle of the second sprocket wheel, a second sleeve extended from the second bottom bracket for receiving the lower portion of the down tube, a second seat tube extended upward from the second bottom bracket, a semicircular sleeve formed at an upper end of the second seat tube for connecting a third crossbar and a second down tube, a second joint tube formed at a rear end of the third crossbar, and a second seat post having a second saddle; wherein the seat post inserted through the joint tube into the second seat tube, the second seat post inserted through the second joint

tube into the seat tube, and the second down tube is releasably coupled to the sleeve.

8. The break apart bicycle of claim 7, further comprising a coupling device formed on the semicircular sleeve, and a fastening member provided on the top of the joint tube which is releasably coupled to the coupling device.

9. The break apart bicycle of claim 8, wherein the coupling device consisting of two parallel plates each featured at least one hole, the fastening member including a plate featured a hole, and a quick release inserted through the holes to compress the plates toward each other.

10. The break apart bicycle of claim 7, wherein the second sleeve comprises at least one longitudinal slit at an upper end, and further comprising a quick release put on the second sleeve for fastening the down tube and the second sleeve together by temporarily deforming the slit of the second sleeve.

11. The break apart bicycle of claim 7, wherein the second joint tube comprises at least one longitudinal slit at an upper end, and further comprising a quick release put on the second joint tube for fastening the second joint tube and the second seat post together by temporarily deforming the slit of the second joint tube.



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茲證明所附文件，係本局存檔中原申請案的副本，正確無訛，  
其申請資料如下：

This is to certify that annexed is a true copy from the records of this  
office of the application as originally filed which is identified hereun

申 請 日：西元 2002 年 07 月 15 日  
Application Date

申 請 案 號：091210758  
Application No.

申 請 人：趙弘昌  
Applicant(s)

CERTIFIED COPY OF  
PRIORITY DOCUMENT

局 長  
Director General

蔡 練 生

發文日期：西元 2003 年 10 月  
Issue Date

發文字號：09221007330  
Serial No.

申請日期：	案號：
類別：	
(以上各欄由本局填註)	

## 新型專利說明書

一、 新型名稱	中文	由不同應力方向進行組合的自行車
	英文	A kitset bicycle combined with different stress directions
二、 創作人	姓名 (中文)	1. 趙弘昌
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	代表人 姓名 (中文)	1.
	代表人 姓名 (英文)	1.



四、中文創作摘要 (創作之名稱：由不同應力方向進行組合的自行車)

一種由不同應力方向進行組合的自行車，主要係由一前車架及一後車架相互組裝而成。其中前車架之一下管以可拆卸方式被插入鎖固於一被焊固於後車架之五通管上的組合套管內，而前車架之上段中管恰可被疊置於後車架之下段中管上方，並藉由座墊的座管由上向下依序插入上段中管及下段中管後，利用兩個快鎖式夾具將座管分別鎖固於上、下段中管內，藉以聯結上、下段中管，且其聯結方向與下管插入組合套管的方向大致相互垂直，使組合後的車架結構可同時承受推力及拉力，藉以強化組合後的車架結構強度者。

英文創作摘要 (創作之名稱：A kitset bicycle combined with different stress directions)

A kitset bicycle combined with different stress directions, consisting of a front frame and a rear frame. One of the down tubes of the front frame can be taken off to be connected with the lower part of a bottom bracket fastened on the rear frame. An upper seat tube of the front frame can be piled on top of a lower seat tube of the rear frame. A saddle pillar inserted into the upper and lower seat tubes and fastened with two quick-release clampers. The inserted direction of



四、中文創作摘要 (創作之名稱：由不同應力方向進行組合的自行車)

英文創作摘要 (創作之名稱：A kitset bicycle combined with different stress directions)

the saddle pillar almost vertical with the down tube in order to increase the compressive and tensile strength of the kitset bicycle frame.



本案已向

國(地區)申請專利

申請日期

案號

主張優先權

無

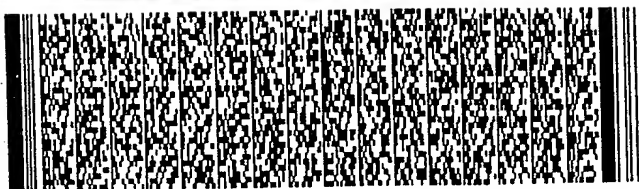
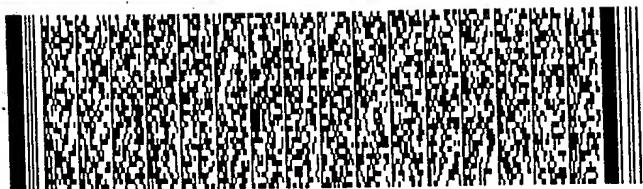
## 五、創作說明 (1)

### 【技術領域】

本創作係關於一種自行車，特別是指一種由不同應力方向進行組合的自行車，其不但方便拆裝而易於收藏運送且可維持與整體式車架相當的結構強度者。

### 【先前技術】

例如鑽石車架MTB、ATB、Y型雙避震車架、淑女車等傳統自行車車架，為考慮其結構強度，一般均係以不可拆卸的方式一體燒焊或熔接成型，此種使用傳統一體成型車架結構的自行車，在出廠運送過程中，通常係將其前輪、腳踏板拆下，再將把手放鬆旋轉90度，使與車架管成一直線，藉以減少其運送材積，當運送至銷售地點後，再由經銷商進行最後組裝作業後，始販售予一般消費者。此種產銷流程雖已行之多年，惟其亦造成製造商、經銷商及消費者三方面的不便及長期困擾。對於製造商而言，此種一體成型車架結構自行車，因其包裝材積過大，造成倉儲、包裝、貨櫃運送等成本大幅度增加。對於經銷商而言，除亦有倉儲、包裝等成本增加的問題外，更必須對自行車進行最後組裝作業，增加其人工作業成本。至於對消費者而言，在其購買自行車後，難以一般轎車放置該無法拆卸的自行車，不論購買地點離家遠近，均需自行騎乘自行車返家或僱用貨車載運，造成消費者極大的不便；尤其是，當消費者欲至郊外騎乘自行車享受原野樂趣時，更因傳統一體成型車架自行車在攜帶上的不便性，造成其難以將自行車放置於一般轎車行李廂中並載運至郊外騎乘的困





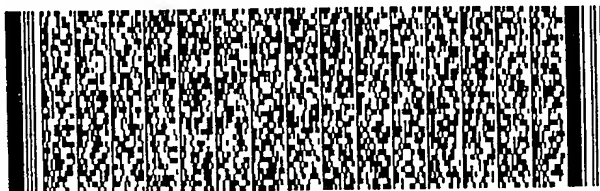
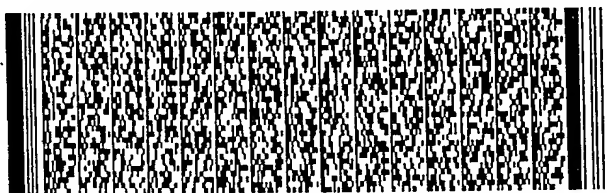
## 五、創作說明 (2)

擾，如使用市售車頂固定架或車尾固定架固定自行車時，則又衍生可能因使用者疏忽致使自行車固定不當意外掉落，進而嚴重影響行車安全的公眾交通問題；上述攜帶不便性即為目前自行車由交通工具轉型成為休閒運動用具的最大障礙。

發展約30年的折疊式自行車，雖然可以解決上述一體成型車架結構自行車難以攜帶的若干缺點，惟因其結構上的種種限制，使其仍存在有諸多缺點，且更衍生出下述其他缺點。

折疊式自行車雖經多年演變改良，惟一直未脫離利用各式各樣鉸鏈結構令自行車由車架管中間對折的技術窠臼，且為遷就此一折疊鉸鏈之結構，使折疊自行車難以使用最受消費者喜愛且結構強度最佳的菱形車架結構，此不但造成折疊自行車結構強度不足的先天性限制，且在其外觀設計上亦受到諸多限制，使折疊自行車的外型往往較為怪異而不美觀，製造商難以生產出外型廣被消費者喜愛接受的折疊式自行車，此為折疊式自行車產量仍遠少於傳統一體成型車架結構自行車的主要因素。

折疊自行車經折疊後，雖可縮短自行車的長度，惟其整體寬度卻亦大幅度增加，此係因其鉸鏈結構難以使前、後車架完全平整地相互疊合，造成折疊後車架為具有某一角度的斜交型態，且自行車中最寬的兩輪輪軸花鼓大致呈相互疊合狀態，此均造成折疊後前、後車架間存在有諸多空隙，造成折疊自行車在折疊後的車架寬度為一體成型式



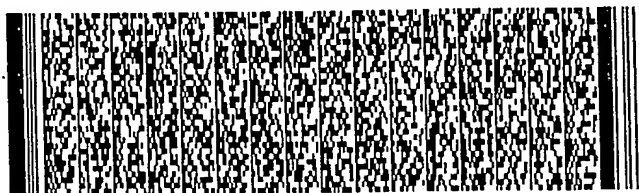
### 五、創作說明 (3)

自行車寬度的二倍有餘，故其折疊後並無法有效減少體積，對於製造商及經銷商而言，不論收藏或運送上仍有其不便性。

另外，折疊自行車經折疊後不但未減輕車重，反而因其折疊鉸鏈以及因應該折疊鉸鏈而須另增的補強結構等重量，而使折疊自行車之車重反較一般自行車的車重更重，以16吋(指車輪尺寸)的小型童用自行車為例，折疊自行車的車重因材質不同一般重約12.5Kg~14.5Kg，此一重量對於一般成人而言，欲將其放入汽車行李廂或取出時，已非屬輕易，如係婦女或兒童則更屬困難，至於青少年或成人所騎乘的24吋、26吋、700C等標準自行車，其車重比16吋小車更重許多，更不易於攜帶移動；由於折疊自行車的車重非輕，縱使其具有折疊功能，亦將影響其訴求及強調的便於攜帶功能。

折疊自行車除了上述在折疊攜帶時無法減輕車重之缺點外，如前所述者，其更有車架結構強度不足的先天性限制，因此折疊自行車不但須另增許多補強構件，亦因此使其通常僅被應用製作為20吋以下的小型自行車，導致折疊式自行車在應用範圍上受到極大的限制。

本案創作人鑑於上述習用一體成型車架結構及折疊式車架結構自行車所衍生的各項缺點，乃亟思加以改良創新，並以多年從事自行車生產事業所累積的經驗，積極從事研究改良，並已成功研發多件組合式自行車，先後向貴局提出專利申請中，惟創作人並不以此自滿，仍本著精



#### 五、創作說明 (4)

益求精的研發精神，不斷進行創新，終於完成本件由不同應力方向進行組合的自行車，其拆裝作業更方便快速、車架結構強度更佳且適用於各種車型。

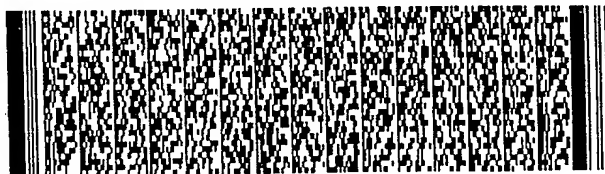
##### 【新型目的】

本創作之目的即在於提供一種組合式自行車，其由大致呈垂直的兩個不同應力方向進行組合，其組合後的車架結構可同時承受推力及拉力，藉以強化組合後的車架結構強度者。

本創作之次一目的係在於提供一種由不同應力方向進行組合的自行車，其不需要純熟技巧即可由一般使用者以DIY方式自行組合及拆解，使其被拆解後可有效縮小其包裝材積，同時至少可將自行車拆解成二部份，使自行車的重量分散，供使用者分次分開拿取，便於使用者以車架拆解後的最小體積及車重分散後的較輕重量，進行收藏、攜帶搬移或放入汽車行李廂中，作為短距離轉乘(例如停車場至辦公室間)或到郊外踏青休閒騎乘者。

本創作之另一目的係在於提供一種由不同應力方向進行組合的自行車，由於自行車屬單人騎乘的交通工具，因此當家庭多名成員同時出遊時，即須利用汽車同時攜帶多部自行車，本創作可將多部自行車以插空隙存放方式一齊存放於汽車行李廂中，更能發揮其縮小材積方便運送之功效，供多名家庭成員出遊時，共享野外騎乘樂趣者。

本創作之再一目的係在於提供一種由不同應力方向進行組合的自行車，其組裝結構適用於各種造型的自行車車



#### 五、創作說明 (5)

架，尤其是適用於美觀性及結構強度均佳的菱形車架以及作為避震車的Y形車架造型，使本案不但具有便於拆解收藏及易於攜帶的便利性，在組裝後，更可維持車架的完整性、美觀性，其結構強度亦維持與傳統一體成型車架應有的結構強度，因此本案之組合結構，不論任何車型車架、大小車種均可適用。

本創作之他一目的係在於提供一種由不同應力方向進行組合的自行車，其在拆解後的各部份車架，得分開單獨個別插空隙存放，可同時縮小其在包裝時的長度及寬度，使其在拆解後所需的包裝材積，較傳統一體成型車架自行車節省約60%，有效減輕製造商及經銷商在倉儲、包裝、貨櫃運送時所需之成本。

#### 【技術內容】

可達成上述新型目的之由不同應力方向進行組合的自行車，主要係由一前車架及一後車架相互組裝而成。該前車架包括有一車頭管、一由下向上穿插通過該車頭管的前叉管、聯結於該前叉管頂端的車把手、以快拆桿鎖固於該前叉管下方且可自由轉動的前輪、以及自該車頭管向後延伸的一上管及一下管；該上、下管可被構型為一菱形車架的前三角部份或一Y形車架等各種車架造型，該上管之尾端聯結一懸空的上段中管。該後車架包括有一供安裝一曲柄式腳踏板及一鏈條式傳動裝置的徑向五通管，該徑向五通管向上延伸焊固有一下段中管，並由該下段中管向後延伸焊固有一包含一上叉管及一下叉管的後叉管組件，上、



## 五、創作說明 (6)

下叉管的尾端併合後共同樞接一可被該傳動裝置帶動而旋轉的後輪，該徑向五通管前端或下方則以一配合該前車架之下管的斜度，焊固連接有一可供該下管插置固定其內的組合套管。

組合前、後車架時，係使前車架的下管穿置固定於後車架的組合套管內，並利用至少一個快鎖式夾具鎖固其結合端；同時使前車架的上段中管與後車架的下段中管相互疊合，並藉由座墊的座管由上向下依序插入上段中管及下段中管後，利用至少兩個快鎖式夾具將座管分別鎖固於上、下段中管內，藉以聯結上、下段中管，且其聯結方向與下管插入組合套管的方向大致相互垂直，使組合後的車架結構可同時承受推力及拉力，藉以強化組合後的車架結構強度者。

### 【圖式簡單說明】

請參閱以下有關本創作一較佳實施例之詳細說明及其附圖，將可進一步瞭解本創作之技術內容及其目的功效；有關該實施例之附圖為：

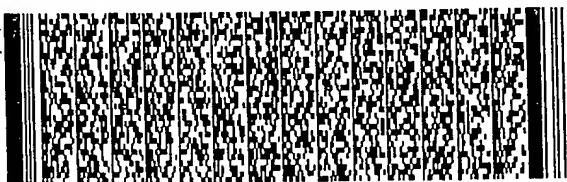
圖一為本創作由不同應力方向進行組合的自行車第一實施例之頂面立體視圖；

圖二為圖一所示組合式自行車經拆解後之立體分解視圖；

圖三為圖一所示組合式自行車之平面視圖；

圖四為圖三所示組合式自行車經拆解後之平面視圖；

圖五為圖一所示組合式自行車中前車架與組合套管之



## 五、創作說明 (7)

放大立體視圖；

圖六為將該組合式自行車拆解後，以分開單獨個別插空隙方式存放，進而將包裝材積縮減至最小狀態時之平面示意圖；

圖七為本創作由不同應力方向進行組合的自行車第二實施例之平面視圖；

圖八為本創作由不同應力方向進行組合的自行車第三實施例之平面視圖；

圖九為圖八所示組合式自行車中上、下段中管另一組合型態之平面放大視圖；

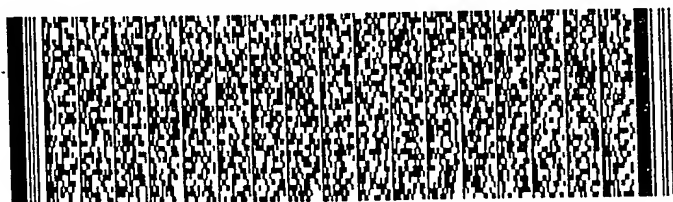
圖十為本創作由不同應力方向進行組合的自行車第四實施例之平面視圖，其主要係加裝一中間車架而被組裝成一協力車者；

圖十一為圖十所示組合式協力車之分解視圖；以及

圖十二為圖十所示組合式協力車中間車架之半圓形開口包覆套管之立體視圖。

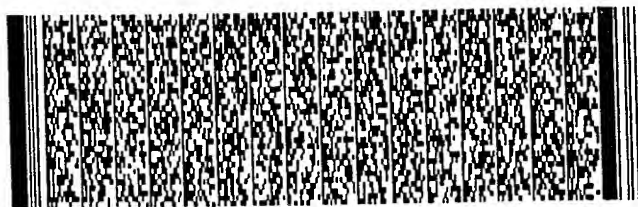
### 【主要部分代表符號】

10 前車架	11 下管
12 車頭管	13 車把手
14 前叉管	15 前輪
16 快拆桿	17 上管
18 加強車架管	19 懸空式上段中管
20 開口端	21 座墊
22 座管	23 第一快鎖式夾具



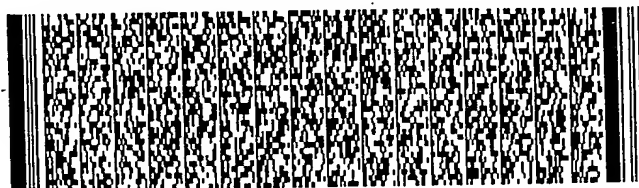
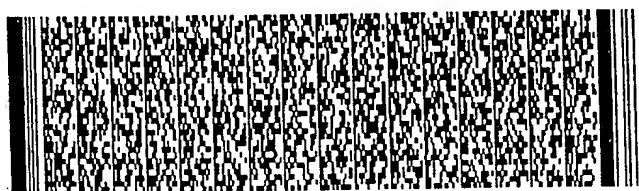
五、創作說明 (8)

- |             |             |
|-------------|-------------|
| 24 第二快鎖式夾具  | 25 第三快鎖式夾具  |
| 26 第四快鎖式夾具  | 27 軸向裂縫     |
| 30 後車架      | 31 五通管      |
| 32 組合套管     | 34 曲柄式腳踏板   |
| 35 鏈條式傳動裝置  | 36 下段中管     |
| 38 上叉管      | 39 下叉管      |
| 40 螺帽       | 41 後輪       |
| 42 開口端      | 43 軸向裂縫     |
| 45 安全銷      | 47 銷孔       |
| 50 對應銷孔     | 53 軸向裂縫     |
| 54 開口端      | 57 塞體       |
| 58 通孔       | 68 裙部       |
| 84 防滲螺帽     | 85 螺紋部      |
| 90 中間車架     | 91 第二徑向五通管  |
| 92 第二組合套管   | 93 第二下管     |
| 94 第二曲柄式腳踏板 | 95 第二鏈條傳動裝置 |
| 96 第二下段中管   | 97 開口包覆管    |
| 98 第二上管     | 99 第二上段中管   |
| 100 加強車架管   | 101 加強車架管   |
| 102 第二座墊    | 103 第二座管    |
| 104 扣合構件    | 105 有孔突耳    |
| 106 夾持構件    | 107 兩側夾板    |
| 108 槽孔      | 109 第五快鎖式夾具 |
| 110 第六快鎖式夾具 | 111 第七快鎖式夾具 |



## 【較佳實施例】

請同時參閱圖一至圖四，本創作所提供之由不同應力方向進行組合的自行車，主要係由一前車架10及一後車架30相互組裝而成；其中前車架10之一下管11以可拆卸方式被插置鎖固於一被焊固於後車架30之五通管31前方的組合套管32內，並利用一第一快鎖式夾具23鎖固其結合端；前車架10之一懸空式上段中管19恰可被疊置於後車架30之下段中管36上方，並藉由座墊21的座管22由上向下依序插入上段中管19及下段中管36後，利用第三及第四快鎖式夾具25、26將座管22分別鎖固於上、下段中管19、36內，藉以聯結上、下段中管19、36，且其聯結方向與下管11插入組合套管32的方向大致相互垂直，使組合後的車架結構可同時承受推力及拉力，藉以強化組合後的車架結構強度。藉由將下管11插置鎖固於組合套管32內以及利用座管22聯結上、下段中管19、36等兩個組合構造，得以將前、後車架10、30快速組裝成一完整自行車。當欲收藏或運送該組合式自行車時，則可拆離座管22，並將下管11自組合套管32內拆解分離，即可快速將前、後車架10、30拆解成獨立個體，必要時更可將前輪15拆下，藉以縮小其包裝材積，不但有效減輕製造商及經銷商的倉儲及運送成本，更可供使用者輕易地將拆解後的前、後車架10、30放置於一般汽車行李廂中，利用汽車將之載運至郊外或停車場後，再行組裝成完整車架，作為短距離轉乘或到郊外踏青休閒騎乘。

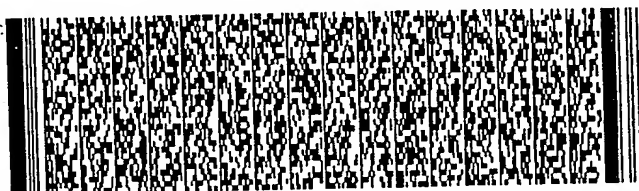
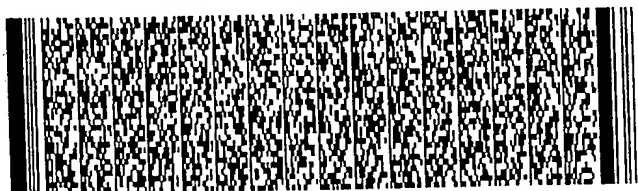




#### 五、創作說明 (10)

該前車架10包括有一車頭管12，一由下向上穿插通過該車頭管12的前叉管14，該前叉管14頂端與一車把手13相互聯結，前叉管14底端則利用螺栓或快拆桿16等已知組合構件組裝有一可自由轉動的前輪15，該車把手13與車頭管12間一般均裝設有兩端軸承，使車把手13可於一角度範圍內自由轉動，以作為供騎乘者操控的主要轉向構件。該車頭管12以一適當斜度向後延伸聯結一上管17及一下管11，其中，該上管17與下管11共同組成為一車架管組件，並可被構型為例如菱形或Y形等各種型式的車架結構，不受本案圖例所限制；本案圖一至圖六所示實施例為一種自行車的Y形車架結構，其上管17係被焊固於下管11的約中段位置上，並在上管17與車頭管12間焊固有一加強車架管18，該上管17之尾端則焊固聯結一懸空式上段中管19，其可供一上設座墊21的座管22插入，該上段中管19於其開口端20開設有至少一個軸向裂縫27，使其開口端20具有一被向內束緊的彈性趨勢，當使用第三快鎖式夾具25束緊於該開口端20時，該上段中管19的開口端20隨之向內變形，進而迫緊鎖固插置其內的座管22。

該後車架30包括有一供安裝一曲柄式腳踏板34及一鏈條式傳動裝置35的徑向五通管31，該徑向五通管31尾端焊固有一向後延伸的下叉管39，並由該徑向五通管31焊固有一向上延伸的下段中管36，該下段中管36係一中空管體，其頂端則與一上叉管38相互焊固聯結，上、下叉管38、39的尾端併合後，利用螺帽40等已知組合構件組裝有一可被

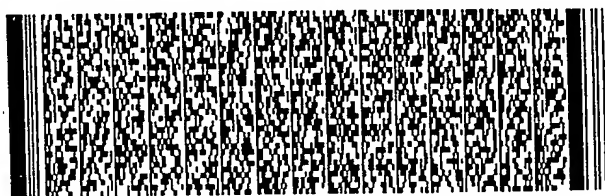
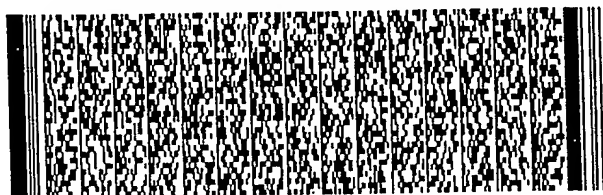


##### 五、創作說明 (11)

該傳動裝置35帶動而旋轉的後輪41；該上、下叉管38、39及下段中管36共同組成為一後叉管組件，連同曲柄式腳踏板34、鏈條式傳動裝置35及徑向五通管31等，使整個後車架30形成一完整的傳動組件；該徑向五通管31前端則焊固連接有一可供該前車架10之下管11插置固定其內的組合套管32，其具有一配合該下管11的斜度。另外，在組裝前、後車架10、30時，該下段中管36恰被疊置於該懸空式上段中管19的正下方，且容許該座管22插入其內，因此，該下段中管36於其開口端42亦開設有至少一個軸向裂縫43，使其開口端42具有一被向內束緊的彈性趨勢，當使用第四快鎖式夾具26束緊於該開口端42時，該下段中管36的開口端42隨之向內變形，進而迫緊鎖固插置其內的座管22。

請參閱圖五，該可被插置進入組合套管32內的下管11，於其近尾端處開設有供一安全銷45穿過的銷孔47，該組合套管32則配合設置有對應於下管11上銷孔47的對應銷孔50，同時更於該組合套管32的開口端54開設有至少一個軸向裂縫53，使其開口端54具有被向內束緊的彈性趨勢。

欲組合前、後車架10、30時，係先使前車架10的下管11尾端插置進入後車架30的組合套管32內，並將座管22由上向下依序插入相互疊置的上段中管19與下段中管36內；然後，利用第一快鎖式夾具23束緊於該組合套管32具有軸向裂縫53的開口端54處，使其開口端54向內變形迫緊插置其內的下管11；同時，分別利用第三及第四快鎖式夾具25、26束緊於該上、下段中管19、36具有軸向裂縫27、43



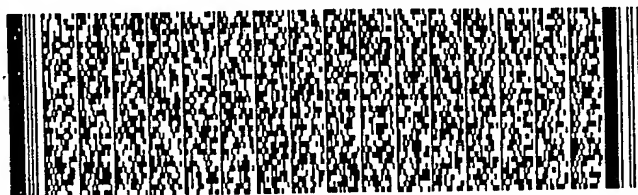
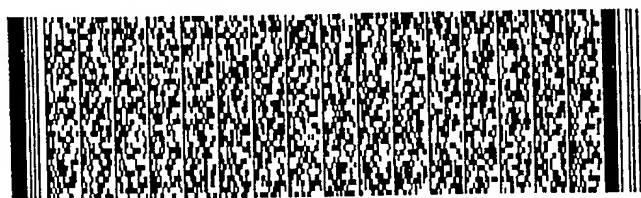
## 五、創作說明 (12)

的開口端20、42處，使其開口端20、42分別向內變形迫緊插置其內的座管22；最後，將安全銷45穿插通過該下管11與組合套管32上對應的銷孔47、50，以增加下管11與組合套管32組裝後的安全性者。

上述各快鎖式夾具係屬一種已知構件，其包括有可相互螺合的螺桿及螺帽以及被樞接於螺桿另端的偏心扳桿，並於該螺桿上加裝有一供一管件穿過其間並類似於C形的扣環，利用扳動該偏心扳桿，使其凸輪表面可施力於該扣環上，藉以向內迫緊穿過扣環的管件，或可反向扳回該偏心扳桿以放鬆管件，以達可快速拆卸或組裝管件之目的。

另外，在下管11被插置進入組合套管32內的尾端部份內，可預先塞置一塞體57，該塞體57於對應上述各銷孔47、50的位置上，亦開設有容許該安全銷45穿過的通孔58，因此，使用者在插置安全銷45時，可沿著該通孔58快速通過，無須在無法目視的情形下暗中摸索另端出口，藉以增加使用者插置安全銷45時之操作便利性。該塞體57同時亦具有補強作用，其可增加下管11與組合套管32穿套部位的結構強度。

請參閱圖六，本創作所提供的組合式自行車，可由一般使用者以DIY方式自行組合及拆解，其在拆解時，僅需將該座管22自上、下段中管19、36內抽出拆離，並將下管11自組合套管32內拆解分離，即可快速將前、後車架10、30拆解成獨立個體；必要時，更可將前輪15自前叉管14上拆下分離，並將車把手13及前叉管14旋轉90度，使與各車

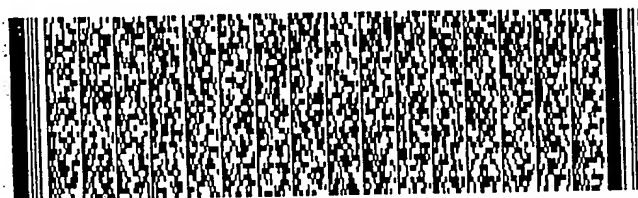
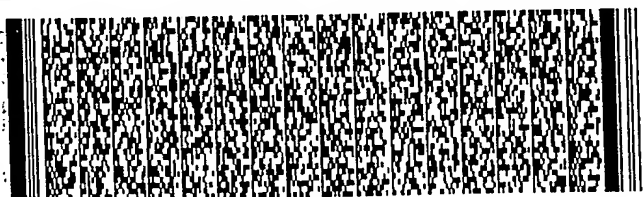


## 五、創作說明 (13)

架管11、17、18平行，另外，經拆解後之座管22連同座墊21亦可選擇被重新插回懸空式上段中管19內，並放低至最低位置處；此時，即可將經拆卸分解後的前車架10、後車架30、前輪15及座管22等四個組件，以分開單獨個別插空隙方式存放或相互疊合，或以帆布袋等容器分別包裝，可同時縮小其在包裝時的長度及寬度，使其在拆解後所需的包裝材積，較傳統一體成型車架自行車節省約60%，有效減輕製造商及經銷商在倉儲、包裝、貨櫃運送時所需之成本；同時，更可將多部自行車以此插空隙存放方式一齊存放於汽車行李廂中，供多名家庭成員出遊時，共享野外騎乘樂趣者。

本創作在拆解或組裝前車架10、後車架30、前輪15及座墊21等組件或構件時，均係使用可快速拆裝的快拆桿或快鎖式夾具等已知構件，其不要求使用者具備純熟的拆裝技巧，即可在短時間內快速完成拆解或組裝作業，以一般使用者而言，平均可在60秒內完成拆裝作業，使本案非常適合於供使用者以DIY方式自行進行自行車的拆解及組裝工作，對於製造商、經銷商、消費者而言，係屬一種三方有利的新型自行車結構。

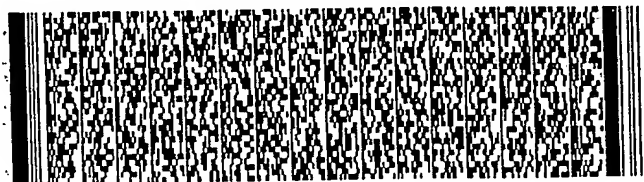
請參閱圖七，係本創作所提供由不同應力方向進行組合的自行車之第二實施例，其主要結構與圖一至圖六所示第一實施例大致相同，其主要不同部份係在於該組合套管32'由原焊固於該徑向五通管31'前方，改變成焊固於該徑向五通管31'下方，在焊固該組合套管32'時，可預先削去



#### 五、創作說明 (14)

五通管31' 的部份下半部，使組合套管32' 部份埋置於五通管31' 內，藉以增加兩者間的焊固面積，進而強化兩者間的結合強度；同時，該組合套管32' 之長度係可跨越該五通管31'，且其兩端均呈開口狀，並於兩個開口端處分別設置有軸向裂縫，使其具有可被向內迫緊的彈性趨勢，此一兩端開口的組合套管32'，有別於第一實施例中僅具一開口端之組合套管；前車架10' 的下管11' 則配合改變其斜度及長度，使其可被順利穿插通過該組合套管32' 的兩個開口端，並分別利用第一及第二快鎖式夾具23、24予以鎖固夾緊其兩端，藉以增強該下管11' 與組合套管32' 間之結合強度；必要時，更可利用安全銷45穿插通過下管11' 與組合套管32' 的兩個結合端，以增加下管11' 與組合套管32' 組裝後的安全性者。

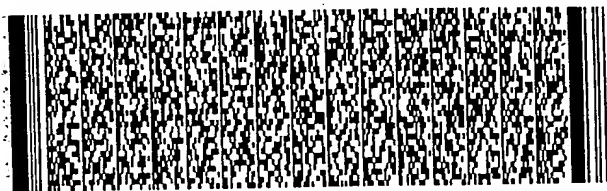
請同時參閱圖八及圖九，係本創作所提供由不同應力方向進行組合的自行車之第三實施例，其主要結構亦與圖一至圖六所示第一實施例大致相同，其主要不同部份係在於以一防滲螺帽84取代第一實施例中的第四快鎖式夾具26，供聯結該懸空式上段中管19與下段中管36。其中，該上段中管19之底端設有一向外凸出的裙部68，使其得以不虞脫落的方式套置一可自由轉動的防滲螺帽84，而該下段中管36則於其頂端刻設有可供該防滲螺帽84旋入的螺紋部85；該附設於上段中管19底端的防滲螺帽84可被旋入下段中管36頂端的螺紋部85內，其除具有聯結上、下段中管19、36之功能外，亦可防止雨水滲入下段中管36內。



## 五、創作說明 (15)

請同時參閱圖十至圖十二，其主要係利用前述構成的前、後車架與一中間車架90配合組裝成一協力車者；該中間車架90包括有一供安裝一第二曲柄式腳踏板94及一第二鏈條式傳動裝置95的第二徑向五通管91，該第二徑向五通管91於其前端焊固連接有一可供該前車架10之下管11插置固定其內的第二組合套管92，該第二組合套管92的構成與前述後車架30上的組合套管32完全相同；該第二徑向五通管91更在其頂端焊固有一向上延伸的第二下段中管96，該第二下段中管96之頂端形成為一半圓形開口包覆管97，該開口包覆管97之主要作用係供分別焊固以不同斜度向後延伸之一第二上管98及一第二下管93，該第二上管98之尾端則焊固聯結一懸空式第二上段中管99，其可供一上設第二座墊102的第二座管103插入其管內，該第二下管93則具有與該前車架10之下管11相同的構成及斜度。另外，更可於該第二徑向五通管91尾端焊固至少一個向後延伸並連接該第二上管98及／或第二下管93的加強車架管100、101，藉以補強該中間車架90的結構強度者。

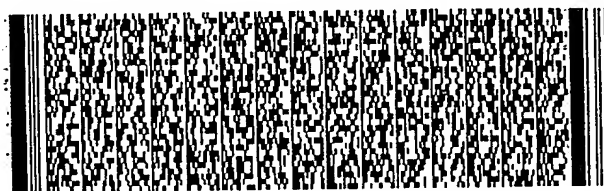
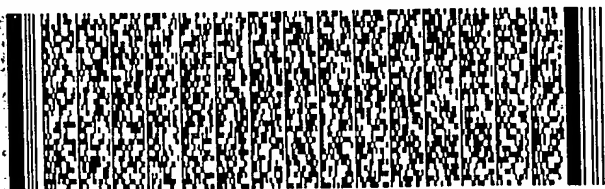
欲組合前車架10與中間車架90時，係先使前車架10的下管11尾端插置進入中間車架90的第二組合套管92內，此時，該第二下段中管96恰可被疊置於該前車架10之懸空式上段中管19下方，且該開口包覆管97亦恰可部份包覆該上段中管19，其後利用座管22由上向下依序插入相互疊置的上段中管19與第二下段中管96內；然後，利用第一快鎖式夾具23束緊於該第二組合套管92具有軸向裂縫的開口端



#### 五、創作說明 (16)

處，使其開口端向內變形迫緊插置其內的下管11；同時，利用第三快鎖式夾具25束緊於該上段中管19具有軸向裂縫的開口端處，使其開口端分別向內變形迫緊插置其內的座管22；如此，即可將前車架10與中間車架90相互組合，惟為加強兩者間的結合強度，更可於該懸空式上段中管19上設置至少一扣合構件104，該扣合構件104包括有一焊固於該上段中管19上的有孔突耳105以及一可穿過該突耳105上通孔的快拆桿，該快拆桿係一種已知構件，其包括有可相互螺合的螺桿及螺帽以及被樞接於螺桿另端的偏心扳桿；另外，於該開口包覆管97上設置一得與該扣合構件104相互扣合的夾持構件106，該夾持構件106包括有自該開口包覆管97向前延伸並對應於該有孔突耳105位置的兩側夾板107，兩側夾板107上分別開設有供該快拆桿穿過的通孔或槽孔108；組合該扣合構件104及夾持構件106時，係使兩側夾板107跨過該懸空式上段中管19，並將突耳105夾置其內，然後利用快拆桿穿插通過兩側夾板107及突耳105，藉快拆桿一側的偏心扳桿以其凸輪表面壓迫該兩側夾板107向中央迫緊該突耳105，而使扣合構件104與夾持構件106相互夾緊扣合，如此，即可補強該前車架10與中間車架90間的結合強度者。

同理，欲組合中間車架90與後車架30時，係先使中間車架90的第二下管93尾端插置進入後車架30的組合套管32內，此時，後車架30的下段中管36恰可被疊置於該中間車架90之懸空式第二上段中管99下方，其後利用第二座管

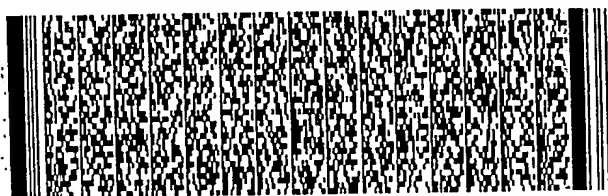
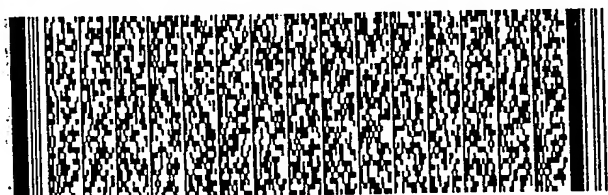


#### 五、創作說明 (17)

103 由上向下依序插入相互疊置的第二上段中管99與下段中管36內；然後，利用第五快鎖式夾具109束緊於該組合套管32具有軸向裂縫的開口端處，使其開口端向內變形迫緊插置其內的第二下管93；同時，分別利用第六及第七快鎖式夾具110、111束緊於該第二上段中管99與下段中管36具有軸向裂縫的開口端處，使其開口端分別向內變形迫緊插置其內的第二座管103。

在分別完成前車架10與中間車架90以及中間車架90與後車架30的組裝作業後，再將該中間車架90的第二鏈條式傳動裝置95聯結至後車架30的鏈條式傳動裝置35上，即可將該前車架10、中間車架90、後車架30組裝成一如圖十所示可供兩人同時騎乘其上的協力式自行車。另外，該座管22上於一適當位置處，可預先利用一第八快鎖式夾具112鎖固一第二車把手113，供該協力車之後方騎乘者放置其雙手，惟該第二車把手113並不具有操控協力車行進方向之功能。

另須陳明者，係自行車所需使用的剎車構件，本創作則可使用無須剎車線的腳剎器，其不但使本案所提供的組合式自行車具有更簡潔美麗的外觀，同時在組裝或拆解作業時，更可省略拆線或裝線所需耗用的作業時間，而為最適宜本案所採用的剎車構件，此種腳剎器係屬一種已知構件，並已為多款市售自行車所採用，可直接被套用於本創作中。另外，如本案採用一般需使用剎車線的手動式剎車構件時，則可採用分離式剎車線的設計，以配合本案的組





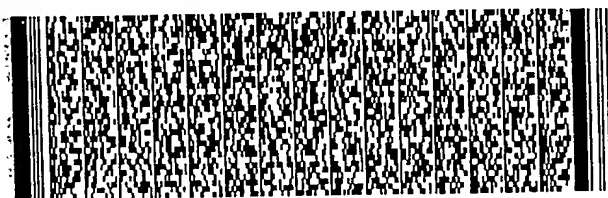
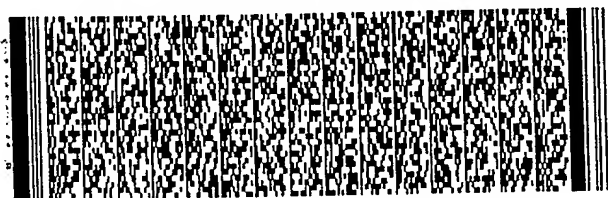
## 五、創作說明 (18)

合式車架結構，如具有頭部及扣孔的分離式剎車線或如將剎車線截斷後以兩端金屬片相互鉤扣者，均為分離式剎車線的典型設計，其均可被直接套用於本創作中；另外，本案亦可在車把手上設置一固定座，並將剎車控制把手鎖固於該固定座上，欲拆解前、後車架時，僅需將剎車控制把手連同剎車線自固定座上拆下，並將之插置於後車架的空隙中，亦為本案可行的剎車構件設計方式。以上所舉各種可分離剎車線或無需使用剎車線的剎車構件，均屬可搭配本案組合式車架結構的可行實施例，惟此部分不屬於本案的範圍。

綜上所述，本創作所提供之由不同應力方向進行組合的自行車，主要係由一前車架10及一後車架30相互組裝而成；其中前車架10之一下管11以可拆卸方式被插置鎖固於一被焊固於後車架30五通管31前方的組合套管32內，而前車架10之一懸空式上段中管19恰可被疊置於後車架30之下段中管36上方，並藉由座墊21的座管22由上向下依序插入上段中管19及下段中管36後，利用第三及第四快鎖式夾具25、26將座管22分別鎖固於上、下段中管19、36內，藉以聯結上、下段中管19、36，且其聯結方向與下管11插入組合套管32的方向大致相互垂直，使組合後的車架結構可同時承受推力及拉力，藉以強化組合後的車架結構強度。

### 【特點及功效】

本創作所提供之由不同應力方向進行組合的自行車，與傳統一體成型式自行車車架結構或折疊式自行車相互比



## 五、創作說明 (19)

較時，更具有下列之優點：

1) 由大致呈垂直的兩個不同應力方向組合前、後車架，其組合後的車架結構可同時承受推力及拉力，藉以強化組合後的車架結構強度者。

2) 由於本案經拆解後的各部份車架(前輪、前車架、後車架)，得分開單獨個別插空隙存放，大幅度縮小使用者的收藏空間，因而可將多部自行車以此插空隙存放方式一齊放置於一般汽車行李廂中，並載運至郊外，供多名家庭成員出遊時，共享野外騎乘樂趣。

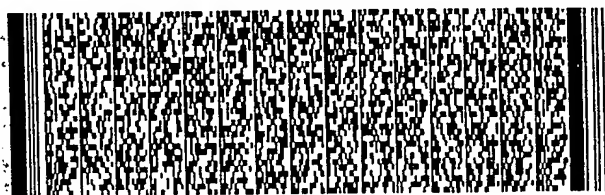
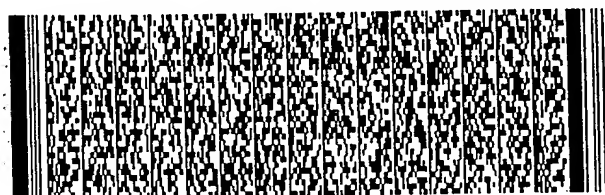
3) 拆裝作業不要求純熟的技巧，可由一般使用者以DIY方式自行組合及拆解，使用者可視本身需要，隨時隨地進行拆解，以利其收藏、攜帶或放入汽車行李廂中；亦可隨時隨地進行組裝，以利其作為短距離轉乘(例如停車場至辦公室間)或到郊外踏青休閒騎乘者。

4) 拆解後將自行車的重量至少拆分成二份，讓使用者搬運時更為輕便，尤其是對於重量頗重的電動自行車的攜帶搬運，更為方便。

5) 容易組裝且快速，既可維持傳統車架的造型，而且不影響傳統車架應有的結構強度。

6) 經銷商不需對自行車進行販售前的最後組裝工序，不但減少其人工作業成本，同時亦減少其倉儲及內陸配送成本。

7) 組裝或拆解作業更為方便快捷，車架結構強度更佳，且容許較大的製造公差。



五、創作說明 (20)

上列詳細說明係針對本創作之一可行實施例之具體說明，惟該實施例並非用以限制本創作之專利範圍，凡未脫離本創作技藝精神所為之等效實施或變更，均應包含於本案之專利範圍中。

綜上所述，本案不但在空間型態上確屬創新，並能較習用物品增進上述多項功效，應已充分符合新穎性及進步性之法定新型專利要件，爰依法提出申請，懇請貴局核准本件新型專利申請案，以勵創作，至感德便。



#### 圖式簡單說明

圖一為本創作由不同應力方向進行組合的自行車第一實施例之頂面立體視圖；

圖二為圖一所示組合式自行車經拆解後之立體分解視圖；

圖三為圖一所示組合式自行車之平面視圖；

圖四為圖三所示組合式自行車經拆解後之平面視圖；

圖五為圖一所示組合式自行車中前車架與組合套管之放大立體視圖；

圖六為將該組合式自行車拆解後，以分開單獨個別插空隙方式存放，進而將包裝材積縮減至最小狀態時之平面示意圖；

圖七為本創作由不同應力方向進行組合的自行車第二實施例之平面視圖；

圖八為本創作由不同應力方向進行組合的自行車第三實施例之平面視圖；

圖九為圖八所示組合式自行車中上、下段中管另一組合型態之平面放大視圖；

圖十為本創作由不同應力方向進行組合的自行車第四實施例之平面視圖，其主要係加裝一中間車架而被組裝成一協力車者；

圖十一為圖十所示組合式協力車之分解視圖；以及

圖十二為圖十所示組合式協力車中間車架之半圓形開口包覆套管之立體視圖。



## 六、申請專利範圍

### 1. 一種由不同應力方向進行組合的自行車，包括：

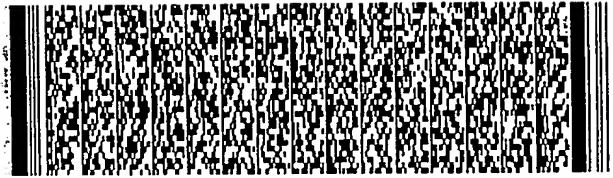
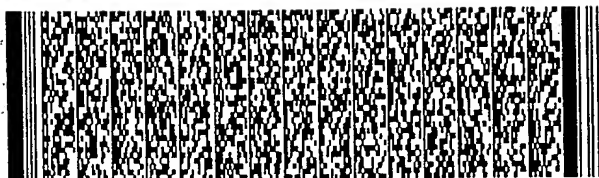
一前車架，其包括有一車頭管，一由下向上穿插通過該車頭管的前叉管，該前叉管頂端與一車把手相互聯結，並於該前叉管底端組裝有一可自由轉動的前輪，該車頭管以一斜度向後延伸聯結一包含一上管及一下管的車架管組件，該上管的尾端設有一懸空之上段中管；

一後車架，其包括有一供安裝一曲柄式腳踏板及一傳動裝置的徑向五通管，該徑向五通管尾端延伸聯結有一後叉管組件，並於該後叉管組件上組裝有一可被該傳動裝置帶動而旋轉的後輪，形成一完整的傳動組件，該徑向五通管上更分別設有一可供該下管插置固定其內的組合套管，以及一向上延伸並恰被疊置於上段中管下方的下段中管，該下段中管係一中空管體；以及

一上附一座墊的座管，其被由上向下依序插入該上段中管及下段中管內，藉以聯結該上、下段中管者。

2. 如申請專利範圍第1項所述之由不同應力方向進行組合的自行車，其中該組合套管係被焊固於該徑向五通管的前端，並具有一容許該下管插入其內部的開口端，該開口端開設有至少一個軸向裂縫，當該下管被穿插進入該組合套管內時，利用一第一快鎖式夾具束緊於該開口端處，使其開口端向內變形迫緊該下管。

3. 如申請專利範圍第1項所述之由不同應力方向進行組合的自行車，其中該組合套管係被焊固於該徑向五通管的下方，且其兩端均呈開口狀，並於該兩個開口端處分別



## 六、申請專利範圍

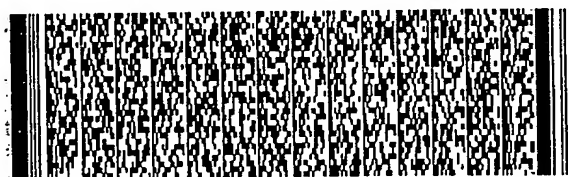
開設有至少一個軸向裂縫，當該下管被穿插通過該組合套管內時，利用一第一及一第二快鎖式夾具分別束緊於該兩個開口端處，使該兩個開口端分別向內變形迫緊該下管。

4. 如申請專利範圍第1項所述之由不同應力方向進行組合的自行車，其中該下管與該組合套管上分別開設有對應位置的至少一個銷孔，其在該下管被插置鎖固於該組合套管後，可使用至少一個安全銷穿插嵌入該等對應位置上的銷孔者。

5. 如申請專利範圍第1項所述之由不同應力方向進行組合的自行車，其中該上段中管及該下段中管分別於其開口端開設有至少一個軸向裂縫，當該座管被穿插進入該上、下段中管內時，利用一第三及一第四快鎖式夾具分別束緊於該上、下段中管之開口端處，使其開口端分別向內變形迫緊該座管者。

6. 如申請專利範圍第1項所述之由不同應力方向進行組合的自行車，其中該上段中管之底端設有一向外凸出的裙部，藉以套置一可自由轉動的防滲螺帽，而該下段中管則於其頂端刻設有可供該防滲螺帽旋入的一螺紋部者。

7. 如申請專利範圍第1項所述之由不同應力方向進行組合的自行車，更包括有一中間車架，其可分別與該前車架及該後車架相互組裝成一供兩人同時騎乘的協力車；該中間車架包括有一供安裝一第二曲柄式腳踏板及一第二鏈條式傳動裝置的第二徑向五通管，該第二徑向五通管於其前端設有一可供該前車架之下管插置固定其內的第二組合



## 六、申請專利範圍

套管，另外，該第二徑向五通管更設有一向上延伸的第二下段中管，該第二下段中管之頂端形成為一恰可部份包覆該前車架之上段中管之開口包覆管，藉由該座管由上向下依序插入該上段中管及該第二下段中管內，藉以聯結該上段中管與該第二下段中管；該開口包覆管上設有以不同斜度向後延伸之一第二上管及一第二下管，該第二上管之尾端設有一懸空式第二上段中管，該第二下管可被插置固定於該後車架的組合套管內，並利用一上設第二座墊的第二座管，由上向下依序插入該第二上段中管及該後車架的下段中管內，藉以聯結該第二上段中管與該下段中管者。

8. 如申請專利範圍第7項所述之由不同應力方向進行組合的自行車，其中該前車架的上段中管上設置有一扣合構件，該中間車架的開口包覆管上則設置有一得與該扣合構件以可拆解方式相互扣合的夾持構件者。

9. 如申請專利範圍第8項所述之由不同應力方向進行組合的自行車，其中該扣合構件包括有一被固定於該上段中管的突耳，該突耳上開設有一容許一快拆桿穿過的通孔；而該夾持構件則包括有被固定於該開口包覆管上並對應於該突耳的兩側夾板，其亦分別開設有供該快拆桿穿過的槽孔；組合該扣合構件及夾持構件時，係使該扣合構件的突耳夾置於該夾持構件的兩側夾板間，令該快拆桿穿插通過該兩側夾板及突耳，並施力於該兩側夾板上，使之向中央迫緊該突耳者。

10. 如申請專利範圍第7項所述之由不同應力方向進



#### 六、申請專利範圍

行組合的自行車，其中該中間車架之第二組合套管具有一容許該前車架之下管插入其內部的開口端，該開口端開設有至少一個軸向裂縫，當該下管被穿插進入該第二組合套管內時，利用一快鎖式夾具束緊於該開口端處，使其開口端向內變形迫緊該下管者。

11. 如申請專利範圍第7項所述之由不同應力方向進行組合的自行車，其中該中間車架之第二上段中管於其開口端開設有至少一個軸向裂縫，當該第二座管被穿插進入該第二上段中管內時，利用一快鎖式夾具束緊於該第二上段中管之開口端處，使其開口端分別向內變形迫緊該第二座管者。





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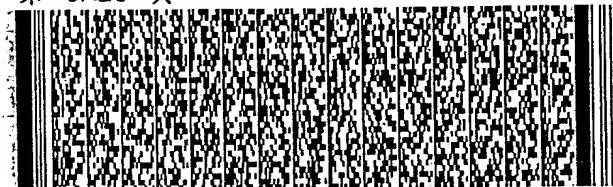
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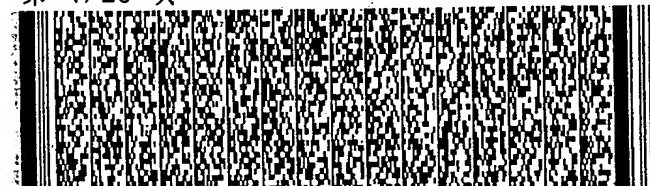
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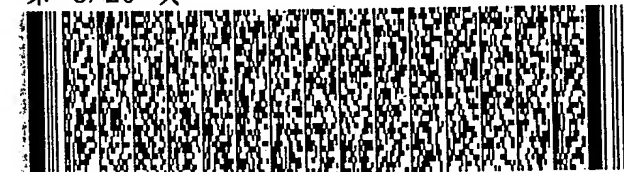
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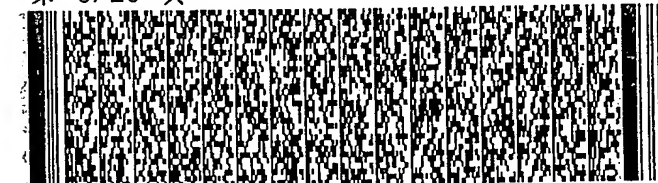
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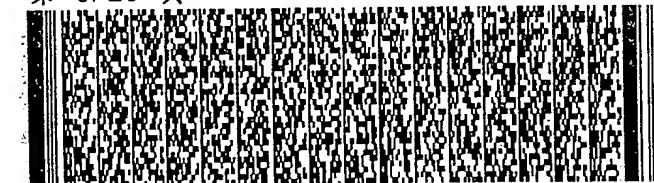
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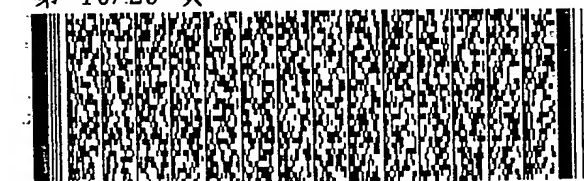
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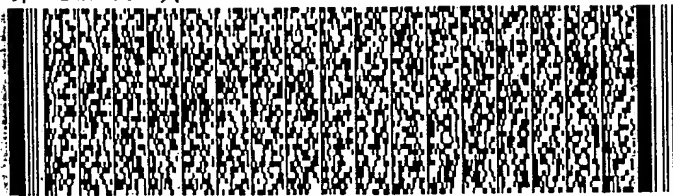
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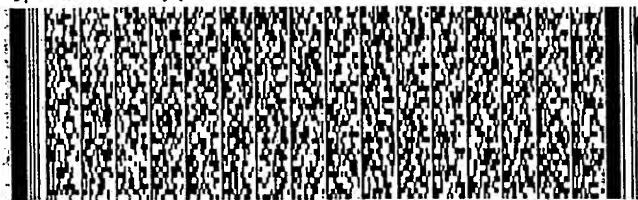
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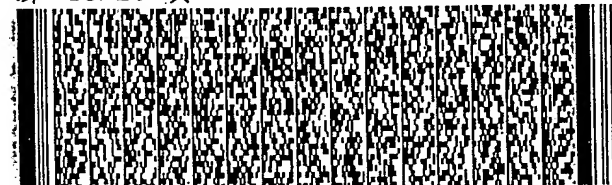
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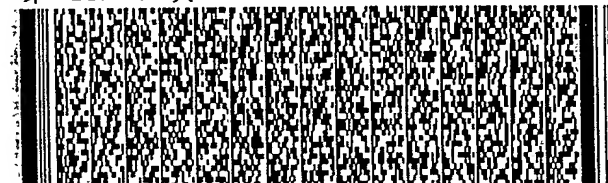
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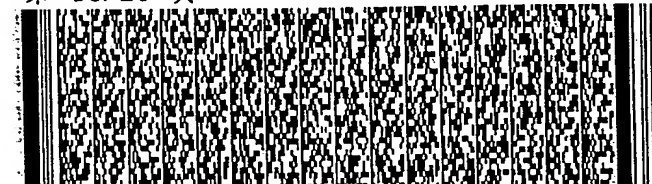
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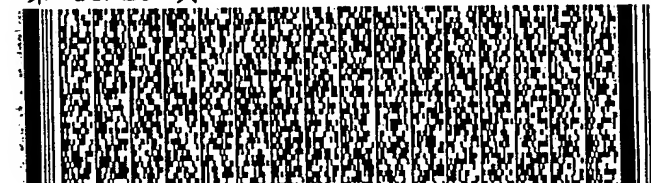
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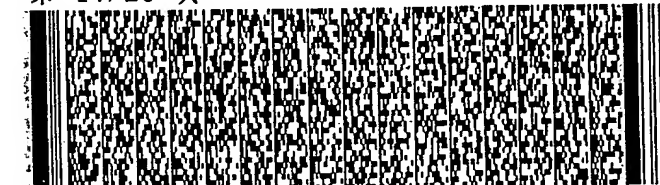
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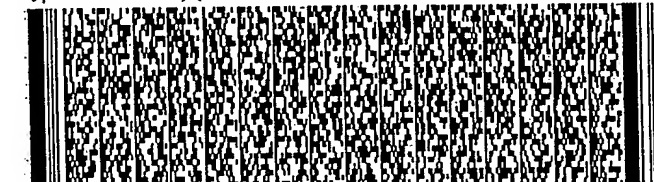
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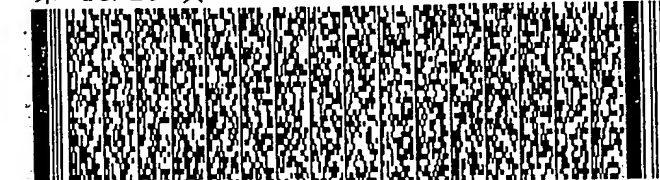
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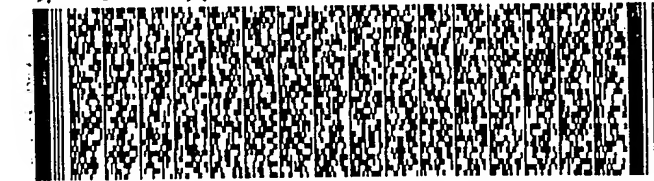
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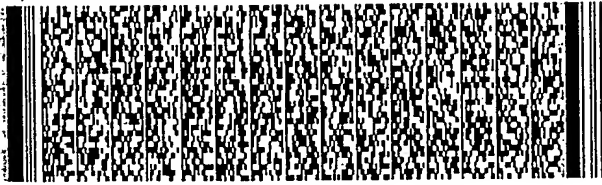
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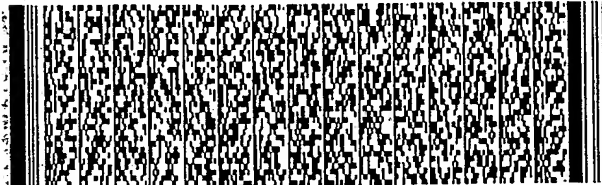
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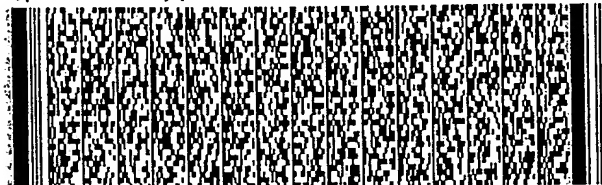
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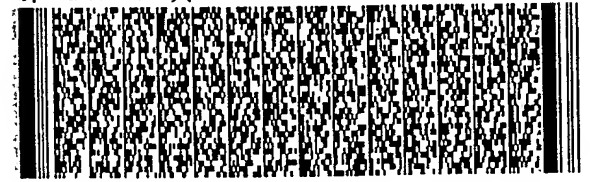
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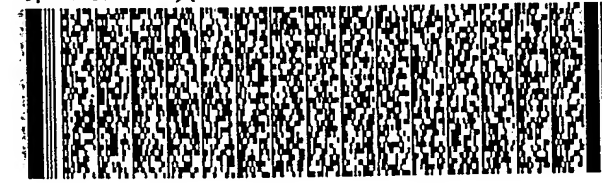
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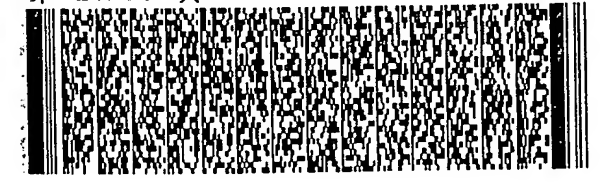
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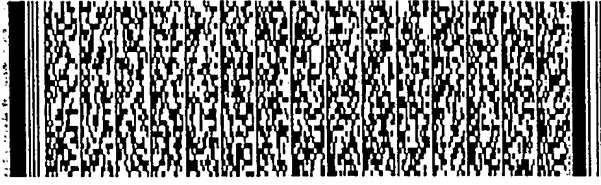
第 27/29 頁



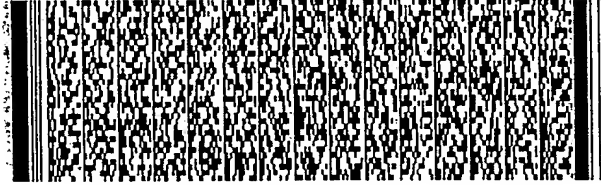
第 28/29 頁



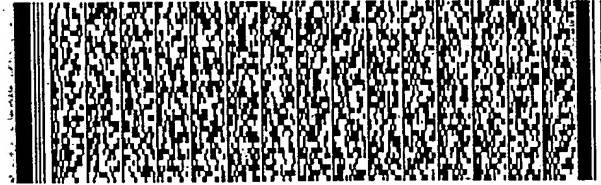
第 20/29 頁



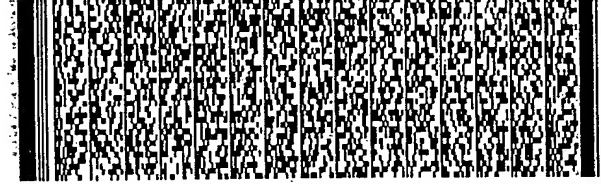
第 21/29 頁



第 22/29 頁



第 23/29 頁



第 25/29 頁



第 26/29 頁

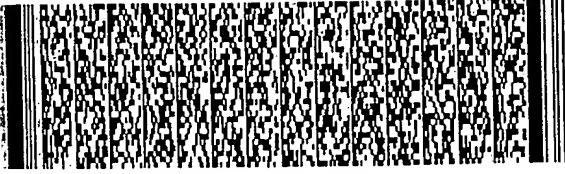


第 27/29 頁



第 28/29 頁





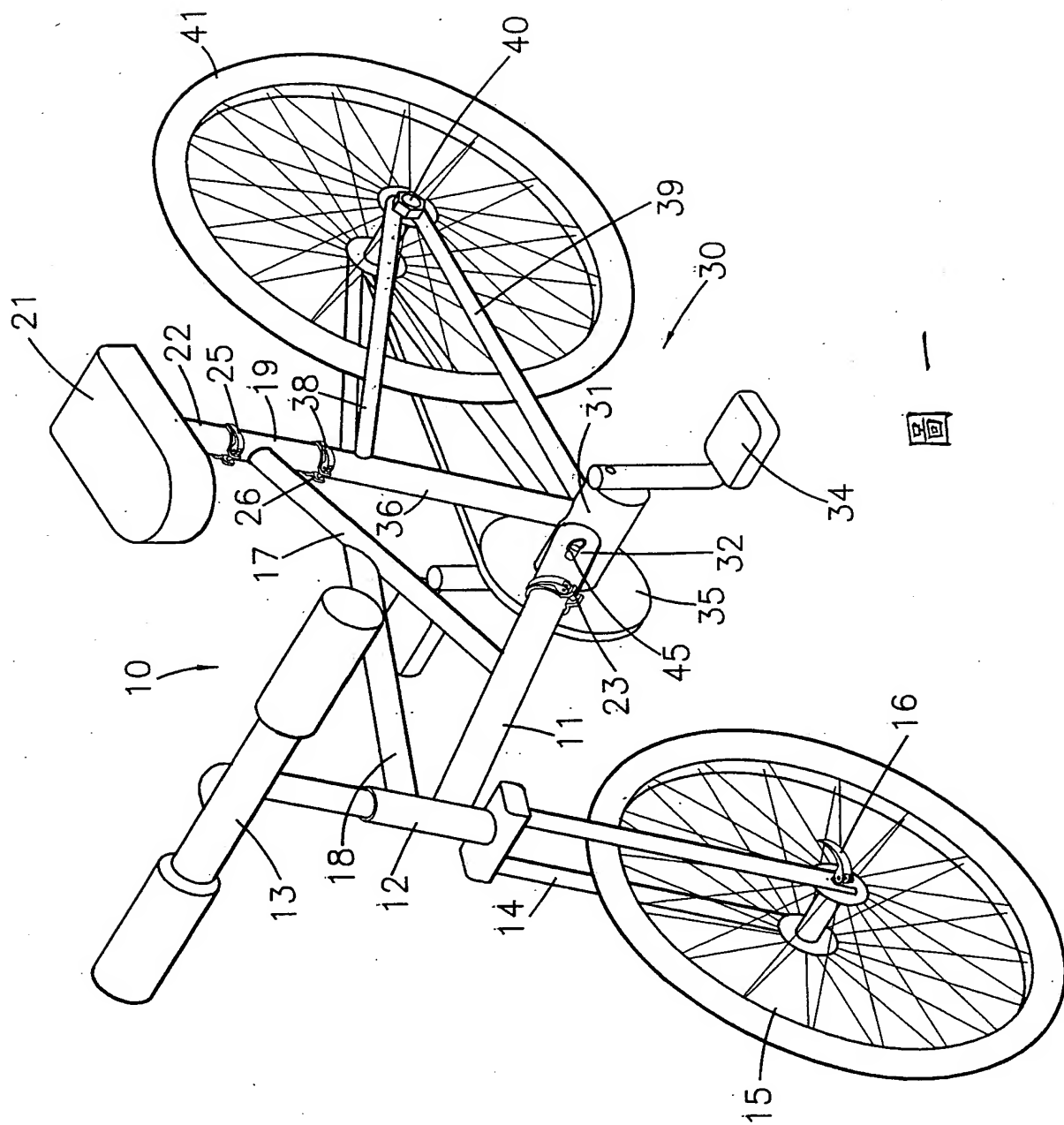


圖 一

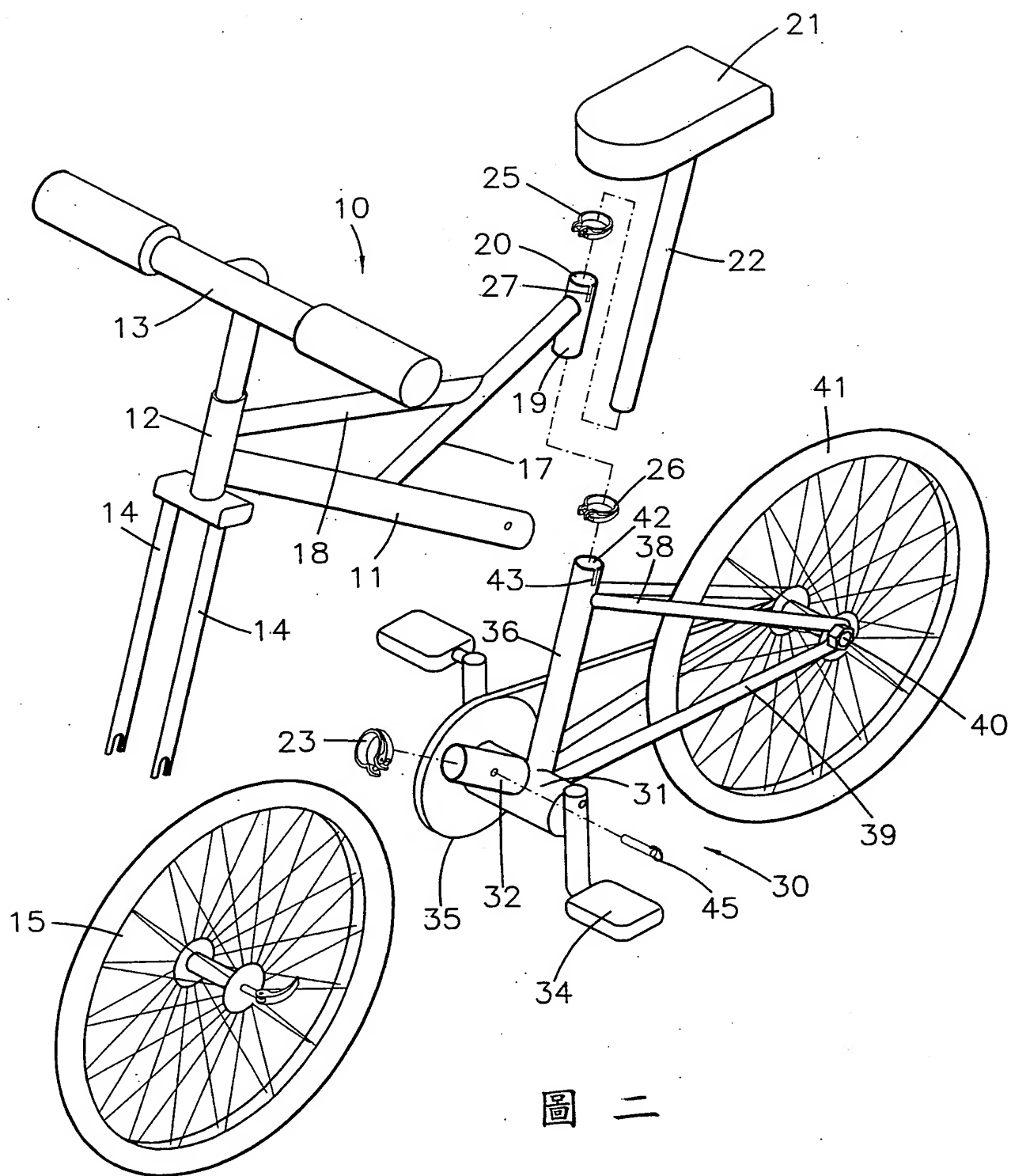
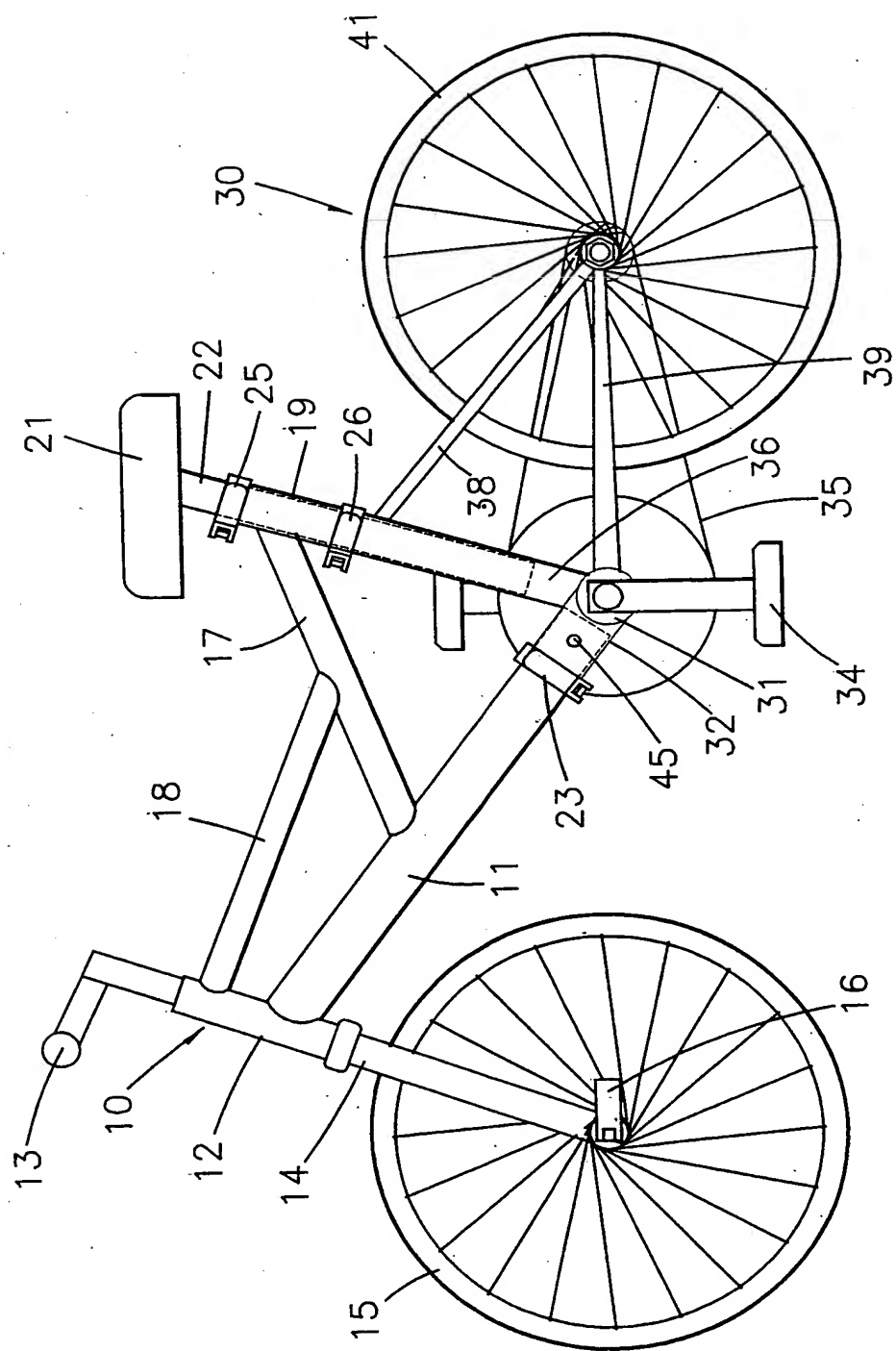
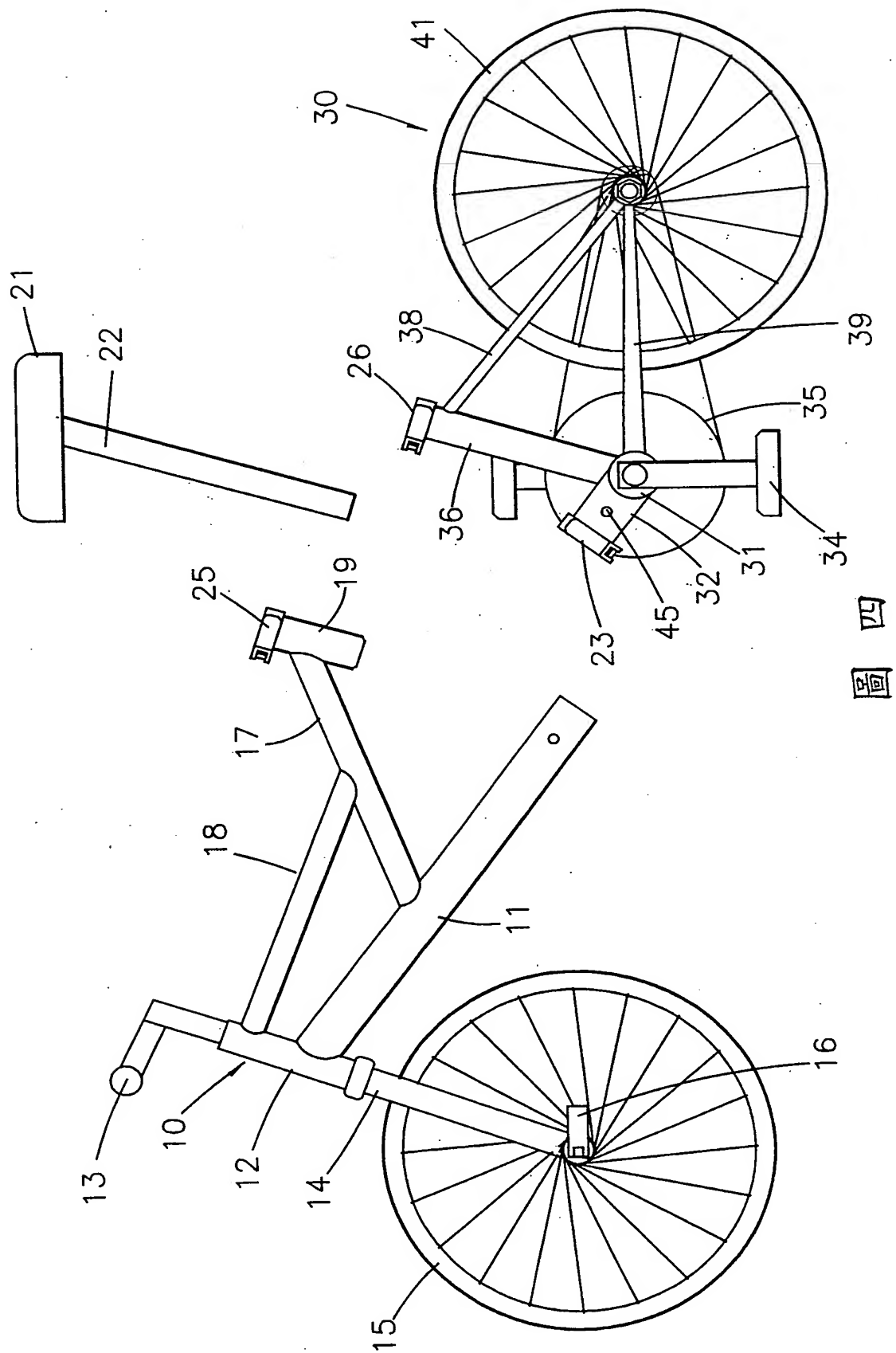


圖 二



圖三





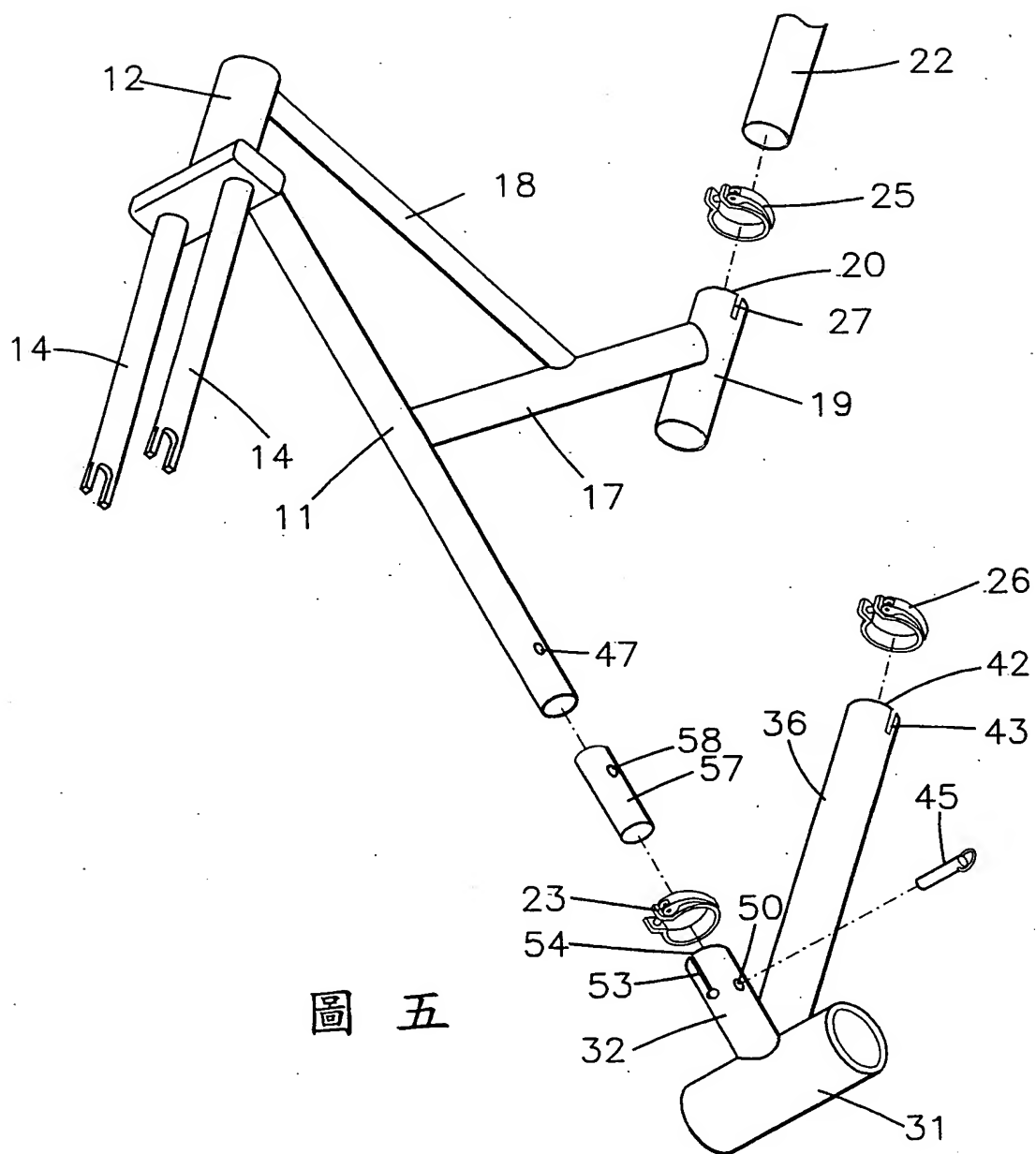
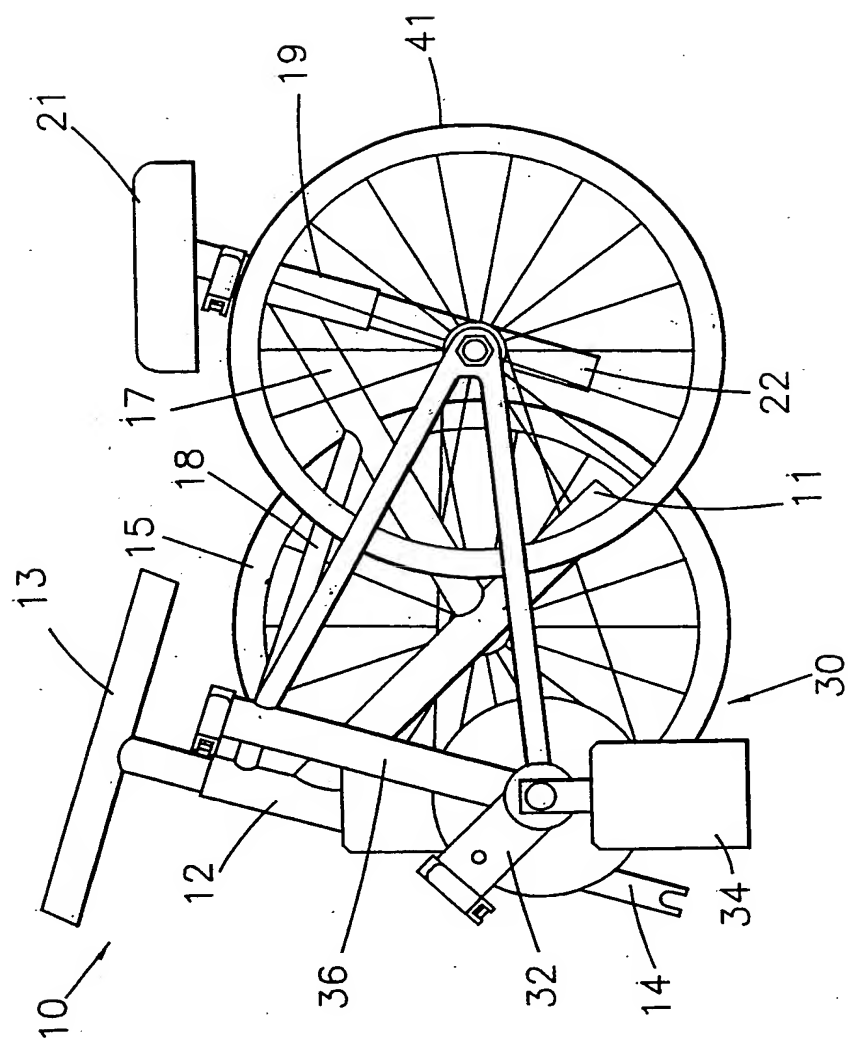


圖 五



圖六

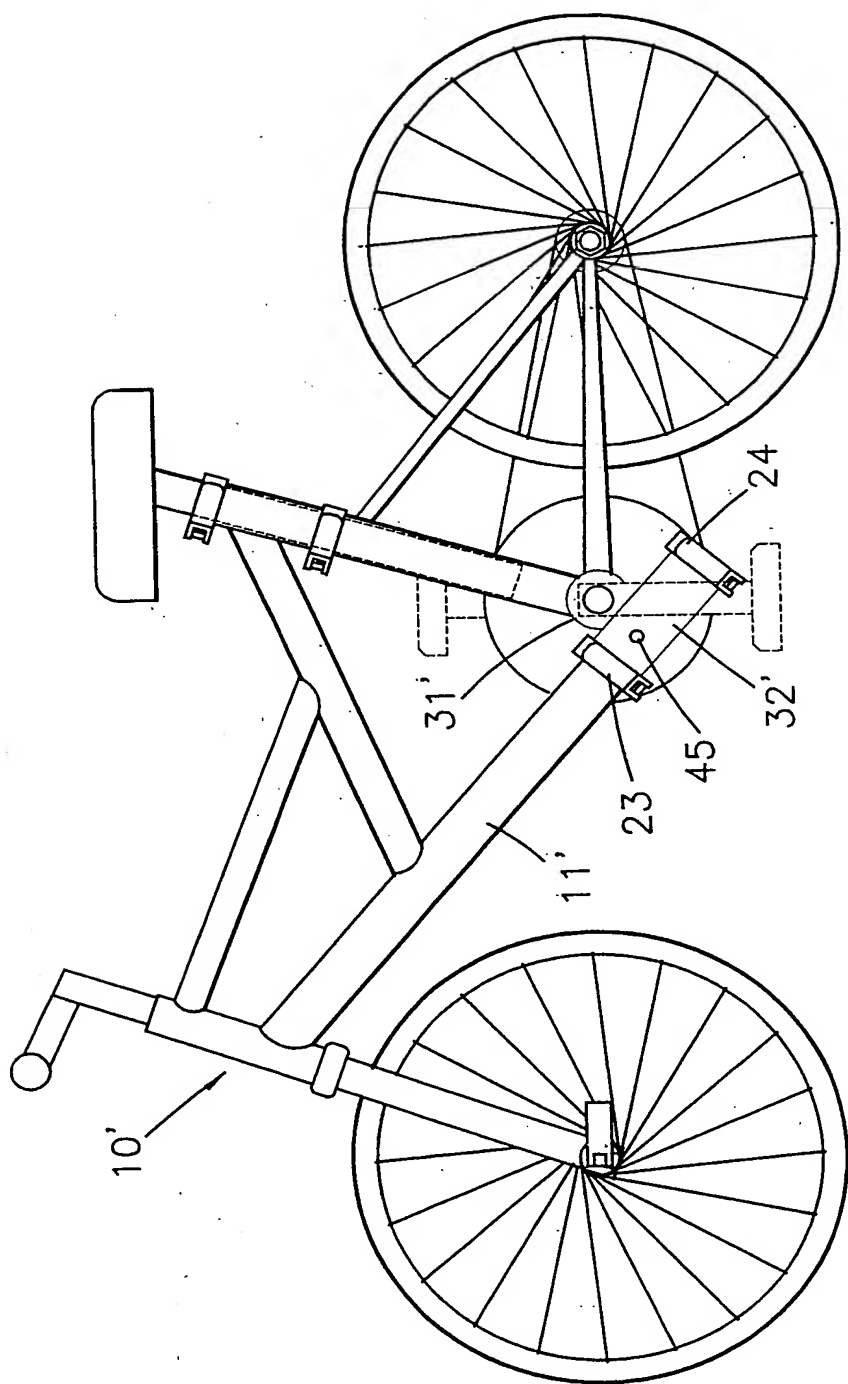
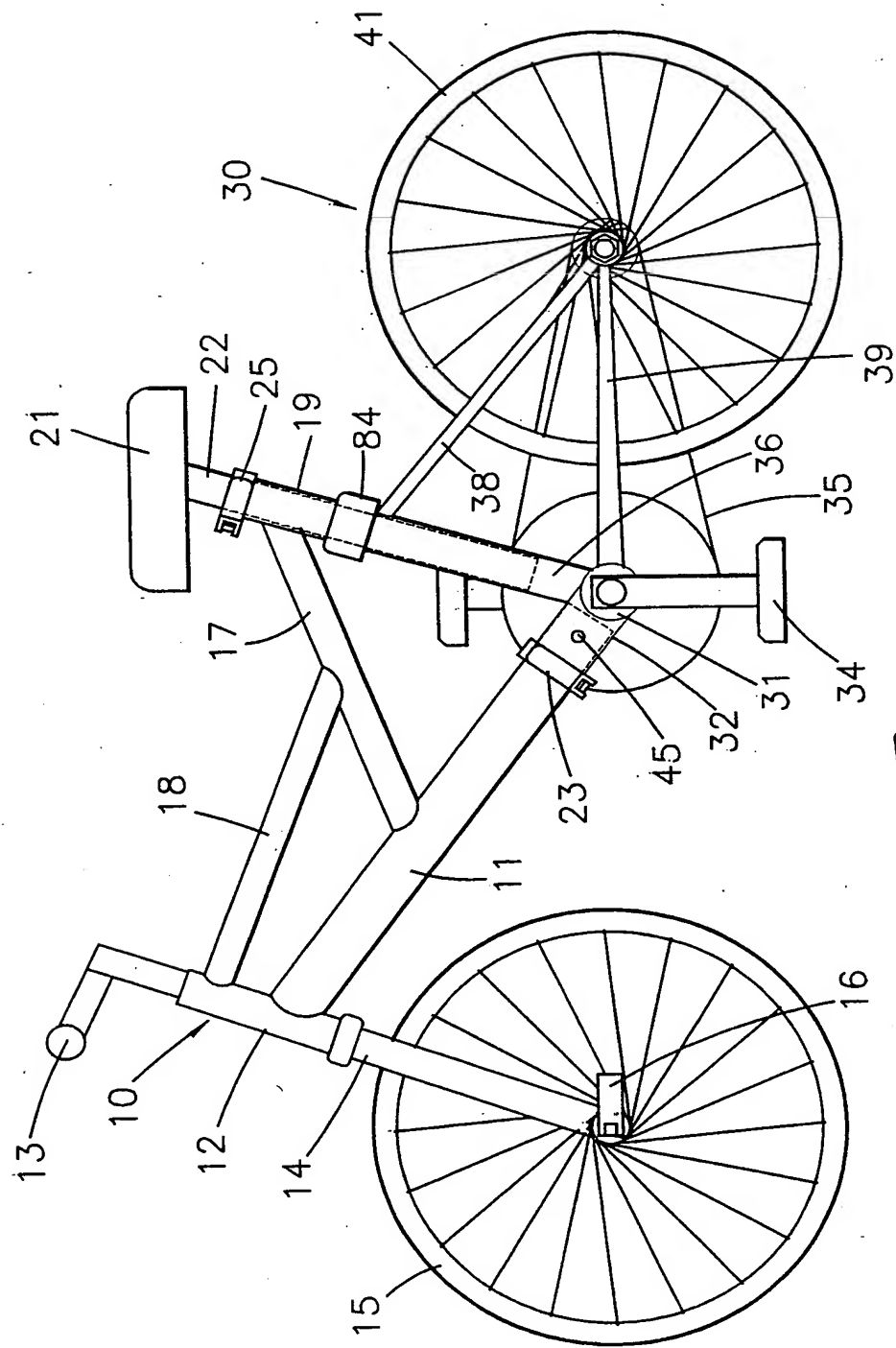
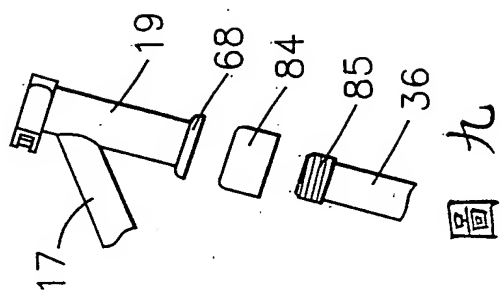


圖 七



圖八



圖九

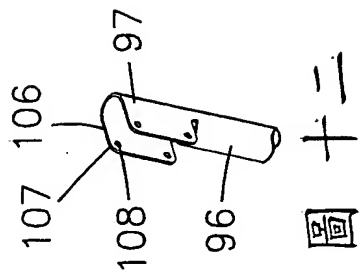


圖 十二

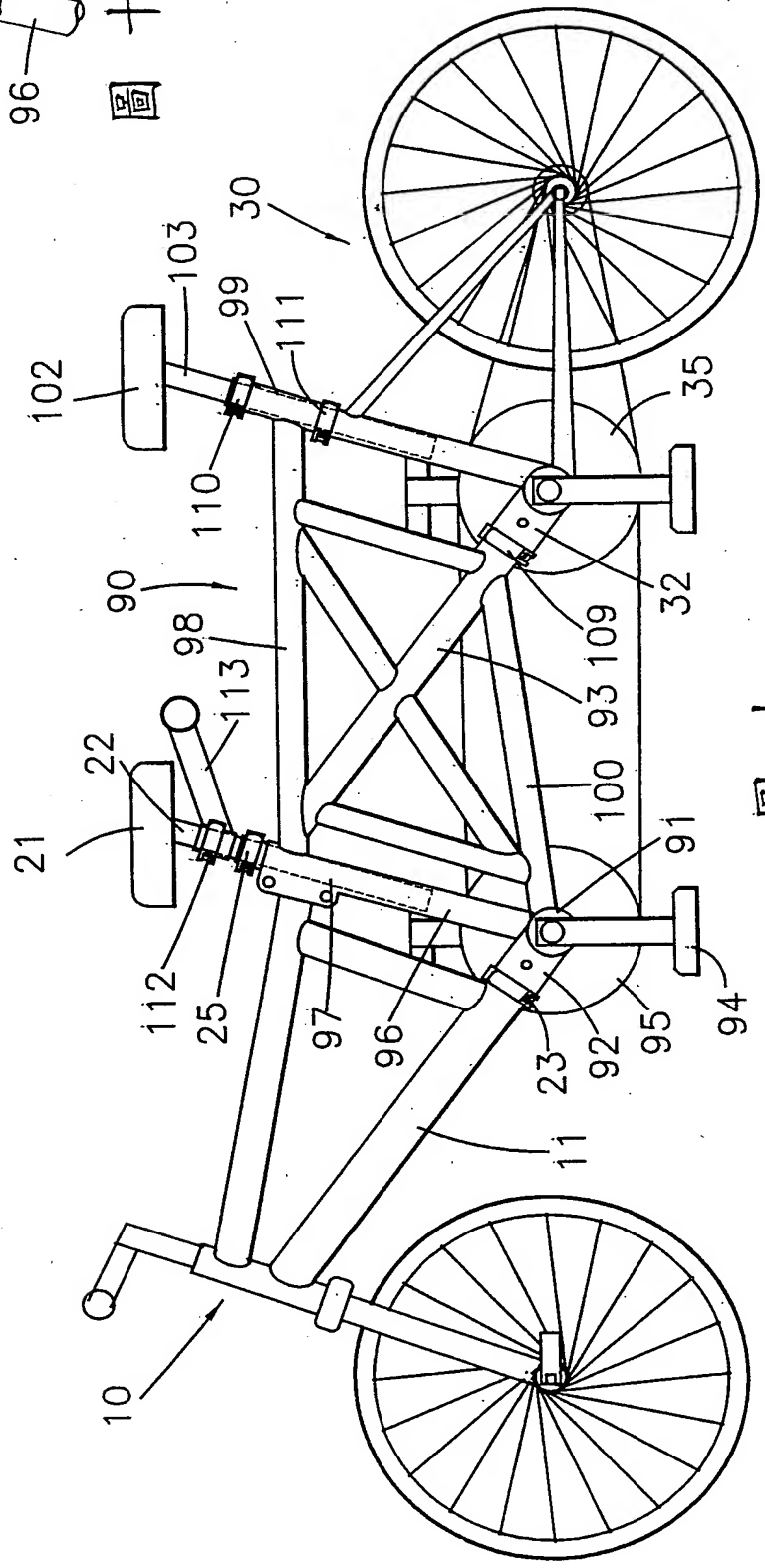


圖 十

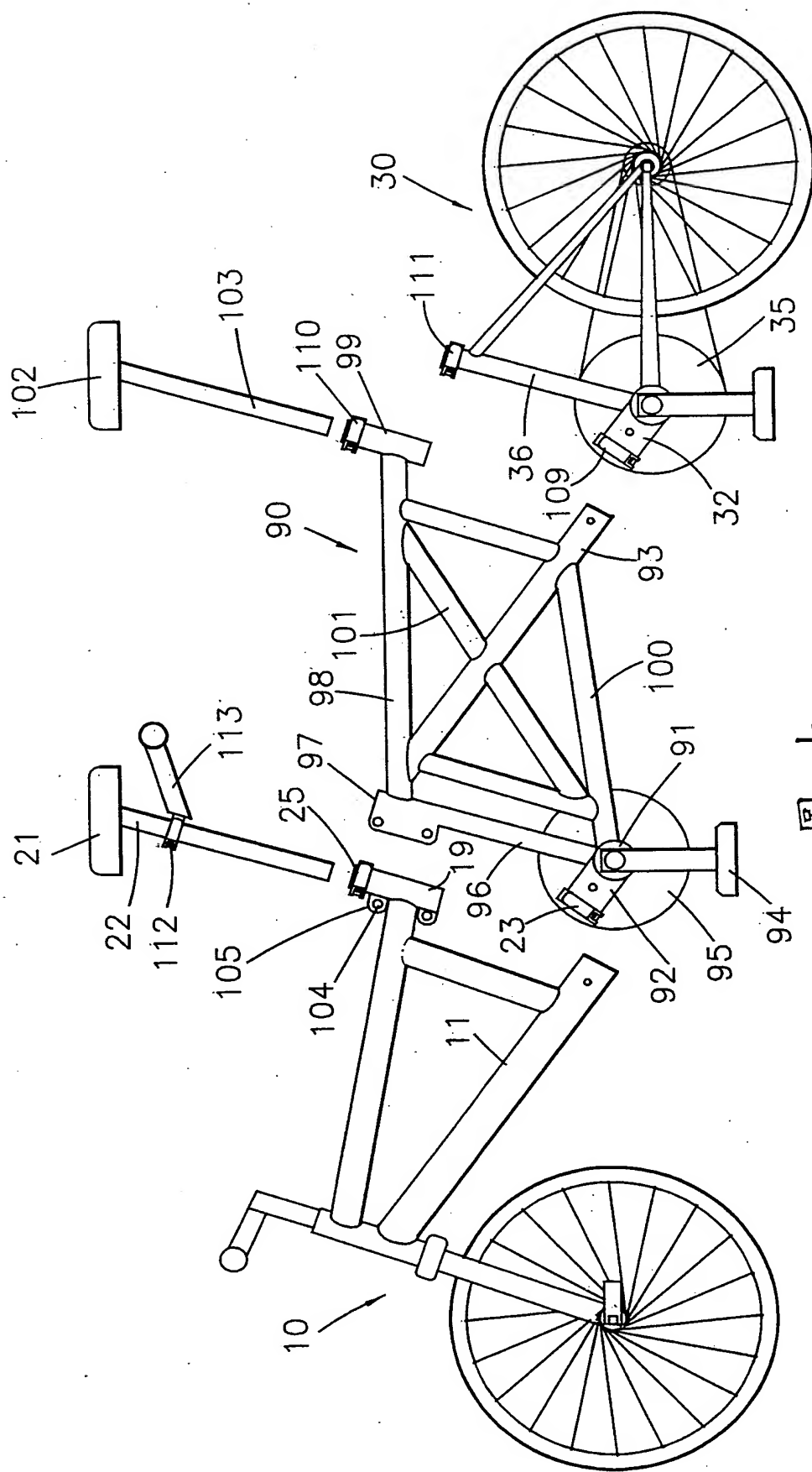


圖 十一